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A

TREATISE

ON THE

DISEASES OF THE EYE

AND ITS APPENDAGES.

BY

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SURGEON TO THE BIRMINGHAM EYE INFIRMARY, ETC.

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TO THE

PRESIDENT,

VICE-PRESIDENTS, AND COUNCIL

OF THE

ROYAL COLLEGE OF SURGEONS IN LONDON,

THIS WORK,

FOUNDED ON THE JACKSONIAN PRIZE ESSAY FOR THE YEAR 1831,

IS MOST RESPECTFULLY INSCRIBED BY

THE AUTHOR.

CONTENTS

OF THE FIRST VOLUME.

PAGE

INTRODUCTION 1

CHAPTER I.

ACUTE INFLAMMATORY DISEASES OF THE CONJUNCTIVA . 39

SECTION I. Simple acute inflammation of the conjunctiva *ib.*

SECTION II. On the more important remedies usually employed for the subduction of ocular inflammation 64

SECTION III. Catarrhal ophthalmia . . . 90

SECTION IV. Purulent ophthalmia in the adult . 104

SECTION V. Purulent ophthalmia of newly-born infants 149

SECTION VI. Gonorrhœal ophthalmia . . 176

SECTION VII. Pustular ophthalmia . . . 221

SECTION VIII. Scrofulous ophthalmia . . 233

SECTION IX. Irritable ophthalmia . . . 297

SECTION X. Erysipelatous ophthalmia . . 305

SECTION XI. Variolous ophthalmia . . . 310

SECTION XII. Morbillous and scarlatinous ophthalmia . 321

CHAPTER II.

CHRONIC DISEASES AND VARIOUS AFFECTIONS OF THE CONJUNCTIVA, AND OF THE SUBCONJUNCTIVAL CELLULAR MEMBRANE . . . 327

SECTION I. Chronic inflammation of the conjunctiva *ib.*

SECTION II. Granular conjunctiva . . . 343

SECTION III. Cuticular conjunctiva . . . 363

SECTION IV. Pterygium 365

SECTION V. Adipose depositions near the cornea . 389

SECTION VI. Fungus of the conjunctiva . . 391

PAGE

SECTION VII. Warts and tumours growing from the surface of the conjunctiva, and tumours within the subconjunctival cellular membrane 395
1 *Warts* . . . . *ib.*
2 *Tumours* 396
SECTION VIII. Altered state of the conjunctival secretion . 398
SECTION IX. Injuries of the conjunctiva, and foreign bodies within its substance, between its folds, or beneath its surface . . . 402
1 *Burns of the conjunctiva* . . *ib.*
2 *Contusion of the conjunctiva* . . 406
3 *Laceration of the conjunctiva* . . 411
4 *Foreign bodies situated upon, within, or beneath the conjunctiva* . . 413
5 *Injury to the conjunctiva by the application of irritating and escharotic substances* . 419
SECTION X. Relaxation of the conjunctiva . . 421
SECTION XI. Œdema of the subconjunctival cellular membrane 423
SECTION XII. Subconjunctival emphysema . . *ib.*
SECTION XIII. Subconjunctival phlegmon . . 424
SECTION XIV. Various changes wrought in the subconjunctival cellular membrane by inflammation and other causes 426

CHAPTER III.

DISEASES OF THE CORNEA . 428

SECTION I. Simple acute inflammation of the cornea . 430
SECTION II. Strumous inflammation of the cornea . 436
SECTION III. Gangrene and sloughing of the cornea . 440
SECTION IV. Opacity of the cornea . . . 444
SECTION V. Arcus senilis 455
SECTION VI. Onyx and abscess of the cornea . . 456
1 *Onyx* . . . . *ib.*
2 *Abscess of the cornea* . . . 464
SECTION VII. Effusion of blood between the lamellæ of the cornea 465
SECTION VIII. Ulcer of the cornea . . . 466
SECTION IX. Hernia, fistula, and dimple of the cornea . 489
1 *Hernia of the cornea* . . . *ib.*
2 *Fistula of the cornea* . . . 490
3 *Dimple of the cornea* . . . 492
SECTION X. Vascularity of the cornea . 493
SECTION XI. Pannus 497

PAGE

SECTION XII. Staphyloma of the cornea . . 502
SECTION XIII. Conical cornea . . . 526
SECTION XIV. Fungoid and other tumours of the cornea . 539
SECTION XV. Injuries of the cornea . . . 540
SECTION XVI. Ossification and various changes in the texture of the cornea . . . 544
SECTION XVII. Imperfect and excessive development of the cornea 545

CHAPTER IV.

DISEASES OF THE SCLEROTICA 548

SECTION I. Simple acute inflammation of the sclerotica . 551
SECTION II. Rheumatic inflammation of the sclerotica . 562
SECTION III. Staphyloma of the sclerotica . . 571

CHAPTER V.

DISEASES OF THE MEMBRANE OF THE AQUEOUS HUMOR . 581

SECTION I. Simple inflammation of the membrane of the aqueous humor . . . 583
SECTION II. Strumous inflammation of the membrane of the aqueous humor . . . 596
SECTION III. Various pathological conditions of the membrane of the aqueous humor . . 604

CHAPTER VI.

EFFUSIONS INTO THE CHAMBERS OF THE EYE . . 606

1 *Hypopium* . . . . *ib.*
2 *Hypoœma* 611

CHAPTER VII.

DISEASES OF THE IRIS 614

SECTION I. Simple acute inflammation of the iris . 618
SECTION II. Chronic inflammation of the iris . . 653
SECTION III. Syphilitic inflammation of the iris . 658
SECTION IV. Arthritic inflammation of the iris . . 689
SECTION V. Strumous inflammation of the iris . . 700
SECTION VI. Prolapse of the iris . . . 710
SECTION VII. Staphyloma of the iris . . . 716
SECTION VIII. Fungous excrescences from the iris . 721
SECTION IX. Abscess of the iris . . . 724

PAGE
SECTION X. Injuries of the iris . . . 725
SECTION XI. Absorption of the iris . . . 726
SECTION XII. Obliteration of the pupil.—Operations for artificial pupil . . . 729

CHAPTER VIII.

VARIOUS PRETERNATURAL STATES OF THE PUPIL AND IRIS . 747
SECTION I. Vacillation of the iris . . . *ib.*
SECTION II. Myosis 750
SECTION III. Mydriasis 753
SECTION IV. Paralysis of the iris . . . 757
SECTION V. Of the permanent pupillary membrane . 758
SECTION VI. Congenital absence of the iris.—Congenital peculiarities in its colour.—Congenital defects in the form and magnitude of its pupillary aperture 761

CHAPTER IX.

MORBID AFFECTIONS OF THE CILIARY LIGAMENT, THE CILIARY PROCESSES, AND THE CILIARY BODY . 767
1 *Morbid affections of the ciliary ligament* . *ib.*
2 *Morbid affections of the ciliary processes* . *ib.*
3 *Morbid affections of the ciliary body* . 768

CHAPTER X.

DISEASES OF THE CHOROID 770
SECTION I. Inflammation of the choroid . . 772
SECTION II. Absence of the choroid pigment, and variations in its colour and quantity . . 785
SECTION III. Absence of the choroid coat . . 786
SECTION IV. Ossification of the choroid . . *ib.*

CHAPTER XI.

DISEASES OF THE RETINA 788
SECTION I. Acute inflammation of the retina . . 789
SECTION II. Chronic inflammation of the retina . 798
SECTION III. Increased and diminished sensibility of the retina . . . . *ib.*
SECTION IV. Various pathological conditions of the retina 800

A TREATISE

ON THE DISEASES OF THE EYE.

INTRODUCTION.*

GENTLEMEN,

AT the institution in which we are now assembled, I have an opportunity of annually witnessing nearly two thousand cases of disease of the eye in its various forms. My means of observation are, therefore, sufficiently abundant; and as there is no other similar charity in this town or neighbourhood, I presume it must be evident that it is my duty to communicate any information my unusually ample opportunities may have enabled me to acquire; —acting under the influence of this conviction, I have determined to give, and to continue to deliver, these lectures, so long as you evince a wish to attend them and so long as I am connected with this infirmary.

My intention to deliver lectures on diseases of the eye was announced the year after I received my present appointment (1828), and at the same time I expressed a desire to publish pretty copious annual reports of the practice adopted at this extensive charity; and it is a source of high gratification to me that I have lived to carry both these objects into effect in a manner which has proved, as far as I can learn, quite satisfactory.

* The remarks comprised in this "Introduction" include the substance of the address with which I prefaced the last course of lectures delivered at the Birmingham Eye Infirmary.

Though in by-gone days an attempt to connect lectures on disease with provincial medical institutions for the reception of the destitute and diseased would have received no encouragement, perhaps, indeed, would not have been allowed by the governors of such institutions, yet, in the present liberal age, when so large a portion of pure and enlightened benevolence is diffused among the community, the supporters of our various medical charities are not only aware that such institutions are peculiarly well adapted for the acquisition and diffusion of professional knowledge, but expect, and sometimes positively require, that the advantageous opportunities they afford shall not be permitted to pass unimproved; and so willing are the members of our profession to comply with a desire so reasonable in itself—so conformable to their own convictions of its expediency and humanity—that, I believe, lectures are delivered, with few exceptions, by their respective medical officers, in connexion with every important medical charity in every extensive town throughout the British empire. As respects my own views upon the subject, I may honestly assert without affectation, that so decided is my conviction of the propriety of rendering *medical charities* subservient to the purposes of *medical instruction*, as far as they can be so rendered consistently with their other objects as respects the poor, (to the relief of whose afflictions they are more particularly directed), that I would not consent to retain my present appointment, if considered to be incapable of assisting, or unwilling to aid, your ophthalmic studies, either by the communication of clinical remarks or by the delivery of a distinct and regular course of lectures.

Such, then, are the motives which have induced me to appear before you on the present occasion; and I now proceed to explain that the objects contemplated in the

delivery of this course of lectures, are, *first*,—to endeavour to make you acquainted with the morbid affections and abnormal conditions of the eye and its appendages, and the mode of relieving and curing them; *secondly*,—to point out certain facts connected with the anatomy of the various parts of the organ of vision and its appendages which appear to be particularly important and curious in themselves, or as assisting my descriptions of disease, or as illustrating some of its more interesting phenomena; and *finally*,—to explain the more material circumstances connected with the physiology of the different parts of the eye, and its adaptation to the purposes of vision.

Gentlemen,—It must be admitted that the study of diseases of the eye is peculiarly interesting; for, in consequence of the superficial situation of some of its textures and the transparency of others, you have frequently an opportunity of rendering its respective maladies objects of visual scrutiny—of, in fact, actually witnessing, and distinctly seeing, the morbid process. When the pleura is inflamed, you may *infer* (I admit pretty correctly) that serum is effused, that lymph is deposited, or that pus is secreted, as a consequence of such inflammation; but, if any of the external textures of the eye or any of those parts which may be seen through its transparent media, are diseased, you have the best opportunity of discriminating, without the risk of error, the form and nature of such disease, of distinguishing its seat, and of determining the character and qualities of its effects, by the aid of vision—by actually witnessing not only its precise pathological state but of observing the *product* of such morbid condition. I repeat, therefore, that this circumstance communicates an interest to the study of diseases of the eye, which is not generally associated with an equal attention to disease when situated in many other parts. But, again,

there are other diseases of the eye, and, indeed, some of its most important maladies, which cannot be so distinguished; in the investigation of which, indeed, a mere inspection of the diseased organ affords scarcely any useful information; for they are not distinctly indicated by any outward and visible signs of morbid action, but are very obscure in their symptoms on cursory examination, and, at the same time, rapidly destructive in their progress; yet, unless most promptly detected, they are exceedingly prone to obtain that degree of establishment which no applications—no method of treatment whatever—will beneficially influence. And, again, they not only differ in degree, but also in their situation, and sometimes require quite opposite modes of treatment. To detect, therefore, the *degree* or *amount* of disease, as well as the *particular texture* diseased, at our first examination, affords, in many instances, the only chance of preventing the loss of vision. Hence, then, you perceive the absolute necessity of early and most attentive investigation, of accurate diagnosis, and of prompt and decisive treatment.

And here I may remark, that in the treatment of acute ophthalmic inflammation it must never be forgotten that it is highly important to arrest its progress at an early stage of its existence, on account of its tendency to terminate in opaque deposition and destroy the transparency of its pellucid textures. The same occurrence may follow inflammation of the pleura—the opposing serous surfaces of that part may be agglutinated by adhesive deposition, and may be rendered opaque without *necessarily* occasioning any extreme injury or producing much inconvenience; but, it must be remembered, that if inflammation proceed to the same extent in the eye so that opaque deposition take place in certain of its textures, it may render that organ

useless, or, by causing it to interfere with the vision of the opposite eye it may render it even worse than useless, although you may succeed in preventing suppuration of the globe or any alteration of its figure; in other words, that termination of inflammation which, when occurring in many other parts is scarcely productive of the slightest inconvenience, is very generally succeeded by the total loss of vision when it takes place in the eye. As far then as regards the preservation of the function of an organ when the seat of disease, it is more necessary to be acquainted with the means of early distinguishing and correctly treating an inflamed state of the eye, than to be properly apprised of the mode of discriminating and managing the inflammatory condition of other parts, the due performance of the function of which parts may be, notwithstanding, absolutely essential to the preservation of life.

These remarks, however, more particularly apply to inflammation of the transparent textures and internal parts of the eye—such, for instance, as the cornea, the membrane of the aqueous and vitreous humour, the crystalline capsule, and the retina,—but you will remember that neglected or chronic inflammation of the conjunctiva are liable to induce equally injurious effects upon vision by acting upon the cornea: for example, if the equality of the conjunctive membrane be destroyed—if that beautifully smooth and even surface become rough and granular,—thickening, opacity, and vascularity of the corneal surface, or, more precisely, of the membrane which covers its primitive layer, may be expected to take place: so that, I repeat, those effects of inflammation, which produce little or no injury when occurring in many parts of the body, are prone to destroy or seriously impair the function of the organ when they take place in the eye.

I need not particularly insist upon the importance of

anatomical knowledge; for, it is presumed, you are familiar with the arguments ordinarily employed to demonstrate the necessity of obtaining an intimate acquaintance with that structure, the disorder or disease of which you may be called upon to relieve or remove.

Let me then urge you to remember, that the morbid affections of the eye are exceedingly numerous; that many of them—and, generally speaking, those of chiefest consequence as respects their results—commence and advance very insidiously; that an accurate diagnosis is of the highest importance; and that this is not likely to be formed without a good knowledge of the anatomy of the eye.

I suppose the investigation of the structure of the eye has been a favourite study. At least it would appear that anatomists have been very anxious to attach their names to various parts of the organ of vision. As connected with the anatomy of the eye, there is, you know, the Liquor Morgagni,—Canalis Petitiana,—Foramen Soemmeringii,—Zonula Zinnii,—Tunica Ruychiana,—Tunica Jocobiana,—in short, there exist many other names and terms, derived from similar circumstances, both before and since the time of Jacob, many of which I have doubtless forgotten. Any of you may be readily furnished with an opportunity of dissecting and minutely examining the structure of the eye; so that there is really no excuse for being unacquainted with its anatomy, as there sometimes perhaps may be for possessing an inadequate anatomical knowledge of some other parts.

Gentlemen,—I do not profess to give an elaborate account of the progress of ophthalmic knowledge,* but

* They who are disposed to study very minutely the history of ophthalmology, may advantageously consult the following works:—Haller (Bibliotheca Chirurgica); Richter (Bibliotheca Chirurgica);

may briefly mention, in these preliminary observations, that, in former times, the treatment of diseases of the eye was in a great measure confined to *Oculists*,—to a class of persons assuming that name,—who very frequently acquired, with great notoriety, considerable wealth and importance. You will not fail to remark that these persons, as their conduct and writings evinced, were characterized by extreme assurance and extraordinary ignorance, and that their treatment of ophthalmic disease consisted almost entirely in the rude and unscientific application of disgusting local remedies. If, however, by the term *Oculist* is meant a person competent to treat the various maladies of the human eye, without any, or only a very slight acquaintance with general anatomy, pathology, and therapeutics, we may confidently assert that there is no such individual in existence; for he only can be considered adequate to the treatment of disease, in whatever part it may be situated, who is conversant with the natural structure of parts, with the laws which regulate the healthy functions, and with the derangements and alterations produced by the encroachments of disease,—with the sympathies, the influences and the connexions subsisting between every part of the animated machine. If, however, in defiance of common sense, you do attempt to disconnect the study of diseases of the eye from the cultivation of the other branches of your profession,—if, in short, you isolate, as it were, the pathology of the eye, and affect to study its diseases for the purpose of becoming mere *oculists*, you must inevitably fail in your attempts to

Langenbeck (Bibliotheca Chirurgica); Beer (Bibliotheca Ophthalmica, &c.); and Wallroth (Syntagma de Ophthalmologia veterum). If the perusal of these works does not supply sufficiently minute and complete information, it will, at least, unfold sources of knowledge adequate to satisfy the mind of the most diligent inquirer respecting the subjects to which they relate.

obtain even an approach to a sound and perfect acquaintance with them. Such, at least, are the views I have formerly expressed and always entertained, and they are decisively sanctioned by my learned friend Mr. Lawrence, in his recently published work. I shall take the liberty of reading to you his opinion upon the subject. Referring to the human body, he says, "in such a system, then, of intricate connexion and mutual influence, each part will be best understood by him who has the clearest notions of the general economy. Even the practical treatment is most judiciously conducted by those who are in the habit of treating disease generally; who do not confine their attention to the part. This confinement is prejudicial, by producing and confirming habits of partial and narrow views, by leading to neglect of mutual relations and influences, by encouraging local treatment. Exclusive attention to a small corner of the animal structure, causes a confinement of mental vision, analogous to the near-sightedness which mechanics contract by constantly poring over the minute objects of their attention. All the habits of the oculist lead to a separation and insulation of the organ. The part is detached from the system, treated by washes, drops, ointments; and this inefficient trifling impedes the progress of ophthalmic surgery. We want, instead of this, general and comprehensive views, the aid of analogy and contrast; the whole field of medicine and surgery must be laid under contribution, for the principles which are to guide us in learning the nature and treatment of ophthalmic disease." (p. 6.)

The preceding quotation comprises but a more refined and elegant expression of the following opinion of Mr. Rowley, contained in his *Treatise on the principal Diseases of the Eyes*, published about eighty years ago:— "An infatuation," says Mr. Rowley, "has prevailed

amongst mankind, that to become eminent in any particular branch of physic, a man must make that branch his particular study. I will venture to affirm, that a man of a narrow or contracted genius will make no advances or improvements in any branch, though he apply to it with indefatigable industry during his whole life; and, in the practice of medicine, all the branches are so mutually connected, that practitioners in any branch cannot be too well acquainted with the whole art." (p. iii.)

I have said that in former times the management of diseases of the eye was in a great measure confined, by popular consent, to a class of persons who styled themselves *oculists*, and who were zealously anxious to impress upon the minds of their patients the utility and necessity of a practice so convenient and profitable to themselves; but, although this custom was very extensively prevalent, it was by no means uniformly adhered to. Here for example, is a book, published for the second time in 1622, namely, "A Treatise of one hvndred and thirteene Diseases of the Eyes and Eye-liddes, by Richard Banister, Mr. in Chyrurgery, Oculist, and Practitioner in Physicke;" and, as though he were unwilling to merge his general professional reputation in the mere character of an *oculist*, he says, in his preliminary address, "vnderstand, courteous reader, that my speciall breeding hath beene in the generall skill of Chirurgerie, &c." It is impossible to derive any other inference from this and similar apologetical explanations which may be found in the works of many other writers of the same period, than that there existed, even at that time, a strong conviction on the minds of the more respectable and better informed members of our profession, of the impropriety of adopting the plausible and attractive title, and the knavery of pursuing the artful and imposing practices of *oculists*, as they then

but too extensively prevailed. It was an honourable and salutary feeling,—a feeling which by no means obscurely evinced that they ardently cherished the character and dignity of their profession, and were unwilling to sanction any conduct or custom which had, as they conceived, the slightest tendency to lower its respectability, impair its usefulness, or impede its advancement.

It is gratifying to find that the same Richard Banister of whom I have been speaking, and who wrote really a very good book on Diseases of the Eye,—it is, I say, pleasing to find such an individual zealous in the exposure of all unprofessional practices, and, apparently as tenacious of his professional dignity and privileges as a M. R. C. S. of the present day. He has devoted a long section of his book to the exposure of what he terms "proud quacksalving mountebankes, that would undertake all cures, and perform few;" and intimates that, "such are they that promise to make blind people see, deafe people heare, and to cure the stone and rupture by cutting;" and thus expresses his virtuous indignation against this cunning fraternity of knaves: "In the methodicall practice and cure of blind people, by couching of cataracts, our English oculists haue alwayes had an especiall care, according to arts, to couch them within doores, out of the open aire, to preuent further danger. Yet some of these mountebanks take their patients into open markets, and there, for vain-glories sake, make them see, hurting the patient, only to make the people wonder at their rare skill. Some others make scaffolds, on purpose to execute their skill vpon, as the Frenchmen, and the Irishman did in the Strand, making a trumpet to be blowne before they went about their work. But these were not long suffered to vse these lewd courses, before they were called before the company of chirurgions; being sharply reprooued, soone left the city, and their abusiue practice."

Now Banister was a poet, and you will find that he did not omit to avail himself of his *gift* when assailing the enemies equally of his exchequer and the dignity of the profession of which he was a legitimate member: in fact, his work abounds in much quaint poetical satire.

However, in spite of Banister's denunciations, irregular oculists flourished; and their habits and manœuvres are pretty well illustrated by the conduct of the Taylors, many of whom were, for many generations, in great repute. The most distinguished of these, after having cured all the curable in this country, according to his own account, travelled to the continent, and there maintained a splendid equipage, his carriage was drawn by four horses, very gaily caparisoned, and was attended by many outriders; the pannels of the carriage were painted over with eyes, to denote his profession, and he adopted as his motto, "Qui visum dat, vitam dat."

But to return—The works of Wiseman, Etmuller, Bidloo, Mead, Turner, and very many other well-esteemed physicians and surgeons of former, though not exactly of ancient times, attest that they possessed a practical acquaintance with many ophthalmic maladies, and attended to them in common with other diseases.

I am quite willing to admit that some names of great professional respectability may be found among the catalogue of those who have, in a great measure, if not altogether, *avowedly* limited their practice to the management of ophthalmic maladies; such, for instance, as Wenzel, Ware, Saunders, Adams, Curtis, &c., but I submit that by far the best works on diseases of the eye, and beyond comparison the most useful discoveries and material improvements in this department of knowledge, have emanated from those who studied ophthalmology as a part of, and in connexion with, their profession generally; such, for example, as

Heister, Cheselden, Pott, Chandler, Warner, Hey, Richter, Schmidt, Sabatier, Scarpa, Barth, Assalini, Gibson, Benedict, &c.:—and if you only refer to a few of those authors of the present day, who have especially distinguished themselves by their ophthalmological researches, you will not fail to collect the names of many individuals who, for general professional attainments, will command your profoundest respect and warmest admiration; and among these you will particularly recognize the names of Farre, Wardrop, Jacob, Dupuytren, Crampton, Guthrie, Vetch, Travers, Lawrence, Tyrrell, Cooper, and Mackenzie. I mention these facts chiefly for the purpose of proving that a most ample and intimate knowledge of ophthalmic disease, is not only compatible with the ordinary pursuits of our profession, but is also materially assisted by the attainment of that information which none but the well-informed physician and thorough surgeon can be presumed to possess.

I may however tell you, that in by-gone days an attempt was made to insinuate that a good knowledge of diseases of the eye, and a due acquaintance with the various other branches of the medical profession, were incompatible qualifications—that, indeed, the former could only be obtained at the expense of the latter; as though the reasoning which applies to knowledge generally, and which admits that the possession of one description of information assists in the attainment of another, were in this instance reversed, and that, in fact, a good ophthalmologist must necessarily be a bad surgeon. Such statements can only be regarded as the product of ignorance, or the result of selfishness or ill-nature, or as proceeding from motives of a still more worthless and questionable character.

Gentlemen,—In requesting your notice of some facts connected with the progress of ophthalmology, I must not forget to direct your attention to the establishment of the

Ophthalmic School at Vienna, in, I believe, the year 1773.* The lecturer's chair in this school has been ably filled by Barth, Schmidt, Beer, Rosas,—names which are already well known to some of you; at all events, they are so well known to every man who has paid much attention to diseases of the eye, that it is almost impossible to say much respecting this class of maladies without, in some measure, adverting to their practice, alluding to their opinions or making use of their discoveries. Beer and Rosas are perhaps the most voluminous writers on ophthalmology, and we are indebted to them for a systematic arrangement of ophthalmic maladies, a minute and accurate description of their symptoms and a circumstantial and unrivalled account of the means of diagnosis. In the year 1804, the London Ophthalmic Infirmary was founded by Dr. Farre and the late Mr. Saunders; and I need scarcely remark that the knowledge of diseases of the eye was materially promoted by the institution of this excellent charity. Since that period, similar institutions have been formed in

* There is an excellent account of the ophthalmological clinic at the Medical School of Vienna in the first volume of the *Quarterly Journal of Foreign Medicine and Surgery*, a work of the highest merit, which to the disgrace of our profession, was suffered to be discontinued for want of adequate support in the year 1821. This account is prefaced by the following sensible and well-written remarks:—"It is necessary accurately to distinguish those practitioners who have of late years applied themselves in Germany to the diseases of the eye, from the class who are termed oculists, whether of that or of any other country. The latter would wish to divide surgery into a number of trades, of which they would monopolize one. The former have not confined themselves to the eye, but all of them have come prepared to the study of that organ by an intimate acquaintance with medical science in general, and many of them have distinguished themselves by their labours in anatomy, and their improvements in the practice of surgery; as for instance, Richter, Schmidt, Barth, and Prochaska. These men have not regarded eye diseases as local merely. They have rendered eye operations less frequent, by their rational and constitutional treatment of those affections which give rise, under mere local and empirical management, to the morbid changes of the eye which afterwards call for the interference of the operator."

almost every considerable town in the kingdom. This Infirmary was founded in 1823; and however unimposing may be its appearance and unobtrusive its pretensions, it has already been the means of affording relief to at least sixteen thousand poor persons suffering from disease or injury of the eye. So that if we are to judge of the value and importance of a medical charity by the extent and character of the benefits it confers, rather than by the magnificence of its architecture and the costliness of its establishment, the humble building in which we are now assembled is by no means disentitled to consideration. I do not however wish to conceal the circumstance that our Eye Infirmary has laboured under great pecuniary difficulties, so that, at various periods since its establishment, its very existence as a charitable institution has been threatened. It has however lingered until the present period, and I am reluctant to believe that an institution which has conferred such marked and acknowledged benefit—which has confined its usefulness to the truly necessitous part of the community—which has prevented so many of the families of the poor in and around this large town from being supported by parochial funds—and which has promptly extended its aid to every applicant who has come recommended to its care by poverty and disease—will not be obliged, will not indeed be permitted to close its doors to the multitude of destitute sufferers who press for admission and implore relief. My acquaintance with the munificence of the governors of this infirmary forbids me to suppose that they will deny it that small amount of support which, from the consistent economy with which its affairs are conducted, is alone necessary for its continuance, and I cannot restrain the expression of my conviction that we shall not be prevented by a cause of this nature from relieving those indigent and unfortunate

objects who flock to us in such abundance to obtain relief from threatened blindness—who ask us less to relieve them from the sufferings of disease than the horrors of dependence.

I shall now, Gentlemen, for a short period, draw your attention very briefly to a few of the more recent works on ophthalmology, which are somewhat comprehensive in their scope. In those instances in which an author has selected only one or two of the more important affections of the eye for his investigation, I shall endeavour to state his opinions in the proper place, whenever such mention of his opinions is deemed advisable or necessary.

One of the earliest works to which I shall now beg your notice is this *Treatise on the Diseases of the Eye*, by George Chandler. It was printed in 1780, and is extremely well arranged and ably composed, for that period. This work cannot, however, be quoted as an authority upon the subjects of which it treats at the present day, and is only remarkable for the methodical manner in which the diseases of the eye are classified, and for those glimmerings of pathological precision founded on accurate diagnosis and philosophical arrangement, which were subsequently, and for the first time, properly and effectively developed in the useful volumes of Mr. Wardrop. It is remarkable that this author mentions that two forms of inflammation of the eye sometimes exist in connection with chancre and gonorrhœa, a fact which had never occurred to the observation of Hunter or Pearson. He applies the term *translative* to what we now call gonorrhœal ophthalmia, and he distinguishes as *symptomatic* the syphilitic iritis.

The great work of Scarpa, *Sulle Principali Molattie degli Occhi*, first appeared in 1801, and was then held in such high estimation that it was quickly translated into various languages, of which the English translation by

Mr. Briggs, and the French translation by M. Léveillé are nearly as well known as the original work. The writings of Scarpa on the medical treatment of diseases of the eye, will, I apprehend, soon cease to be quoted. He has laid too much stress upon local remedies and has not even objected to recommend many of the loathsome, disgusting and absurd compositions which constituted the more material agents employed for the relief of ophthalmic complaints by many of the oculists of olden times. His suggestions in reference to cataract and artificial pupil, and his description of fungus hœmatodes of the eye, possess, however, the highest value, and are entitled to that respectful applause we so freely and cheerfully accord to nearly all his learned labours.

Mr. Wardrop's scientific work on the *Morbid Anatomy of the Eye*, was published in 1808; and it is by far the best work of the kind which has yet appeared. This valuable book has accomplished for the pathology of the eye, what the immortal work of Andral has effected for general pathology, and you are as yet scarcely in a condition to appreciate the extent of your obligations to its talented author. The style of the writer is remarkably clear and simple, his views of disease enlightened and philosophical,—the arrangement of the work is most judicious, and its scope as ample and comprehensive as the nature of the subject permits. In fact, this book contains a good and compendious account of the morbid anatomy of the eye, and is, moreover, adorned with a series of neat engravings which illustrate, in a very satisfactory manner, many of the diseased changes to which the organ of vision is liable. Whatever may be the merit of succeeding publications these volumes will always be held in great estimation by those who are acquainted with the humble condition of ophthalmic knowledge in England at the period of their publication.

I shall next speak of the *Dictionnaire Ophthalmologique* of Wenzel, which was published in 1808. This work consists of two octavo volumes, and contains, for the time at which it was written, a very good definition of nearly all the more ordinary terms employed by writers on ophthalmology, a correct description of the instruments used in ophthalmic surgery, and a brief account of the diseases of the eye and the operations occasionally required for their relief &c.; but I will not prolong my notice of its contents but quote its title page, which sufficiently unfolds the objects contemplated by its industrious author: "Manuel de l'oculiste, ou dictionnaire ophthalmologique, contenant une discription anatomique de l'œil; une définition des maladies qui l'affectent; des observations particulières sur les médicamens et les opérations qui peuvent les guérir; enfin une notice des auteurs qu'il convient de consulter." You will at once perceive that when a work of this nature becomes necessary, the branch of knowledge to which it relates must have made considerable progress, and you will be prepared to recognize the utility of a production which comprises so much requisite information on a very diffuse and extensive subject in so compact and accessible a form.

The posthumous work of Mr. Saunders *On some practical points relating to diseases of the eye*, was printed in the year 1811, and is allowed to have done much towards the diffusion of ophthalmic knowledge. Although he has only considered a few diseases there is a perspicuity of arrangement, minuteness of description, accuracy of diagnosis, and propriety of treatment embodied in his remarks, which place them in decided advance of the works on the same subject of every preceding writer in this country. But whilst paying this just tribute of approbation to this talented and excellent individual, I must not omit to state

that the observations of his friend and editor Dr. Farre constitute a very valuable part of what is usually considered the work of Mr. Saunders. To Dr. Farre we are indebted for an ingenious arrangement of ophthalmic maladies, and for suggesting the use of calomel in combination with opium as a means of arresting inflammation of the iris and deep seated textures of the eye, and of removing some of its effects; and to Mr. Saunders we owe the deepest obligation for having urged, by precept and example, the necessity, and for having pointed out the advantages, of operating upon infants suffering from congenital cataract.

The work of Sir W. Adams *On Ectropium, artificial pupil, and cataract* appeared in 1812,—and is certainly entitled to respectful consideration. I dislike as much as any one the reputed practices of this titled oculist, but I cannot at the same time forget that he has made me, in common with every member of the medical profession, greatly his debtor by his ingenious suggestions on the two first subjects of his treatise. His remarks on *ectropium* and *artificial pupil* are, for the most part, original, ingenious, and practical, and will ever constitute an important part of the progress of knowledge on those subjects.

The *Traité des maladies des Yeux*, of M. Demours, was published in 1818, and appeared certainly, in a very imposing and voluminous form. This somewhat pompous production is not absolutely destitute of merit, but that merit is by no means commensurate with its extraordinary size and very great expensiveness. There are, scattered through these volumes, a few sensible and original remarks respecting the development and the minute anatomy of certain parts of the organ of vision, and some useful information relating to the nature of its maladies may be collected by the diligent reader, but the arrangement of

the subject is defective, and, for the most part, the descriptions of disease are long winded and inexact, and the treatment of them absurd, inefficient, and incorrect.

I have great pleasure in directing attention to the *Practical Treatise on Diseases of the Eye*, by Dr. Vetch, which was published in 1820. Although this work treats only of some ophthalmic maladies and is by no means so correct, comprehensive, and learned, as the more recent publications of Lawrence and Mackenzie, it is entitled to the praise of containing much sound practical information respecting the history and treatment of the more important affections of the eye. The chapters on those forms of inflammation of the conjunctiva attended with, and characterized by, a much increased discharge from its surface, comprise far more information than can be found in the work of any preceding writer upon the same subjects, and will long constitute a useful source of reference. You will find, in these valuable *Chapters*, the essence, or if I may be allowed the expression, the seeds of many very recently announced *discoveries* relating to the treatment of these forms of conjunctival inflammation.

In the year 1820 Mr. Travers published his useful *Synopsis of the Diseases of the Eye*, and, without having undergone much correction or alteration, it has already passed through several editions. Now, many works which were printed several years ago, and which were very deservedly popular at the time they first appeared, require, if subsequent editions are called for, that the information they then contain be " brought down to the present time," and I would venture to suggest to Mr. Travers, that it will be improper to neglect this custom when preparing a new edition of his Synopsis of the Diseases of the Eye. This book is not certainly distinguished by any very important original remarks, neither does it contain any material and new

information which was unknown to well-informed practitioners at the time it first appeared—in fact, some parts of it, and especially those which relate to the malignant affections of the eye, are disfigured by fanciful and erroneous notions of pathology, and are now only perused to mark the progress of improvement on these obscure and interesting subjects. However it must be admitted that another edition of this work, containing the enlarged experience of its author, and divested of the errors to which I have just referred, and enriched by the introduction of those new and philosophical views of pathology which have recently resulted from the scientific labours of many members of our profession, would constitute a useful addition to ophthalmic literature.

In the year 1823 or 1824, Mr. Lawrence commenced the delivery of that systematic and well-known course of lectures on ophthalmology, which formed the basis of this, his recent work—beyond comparison the most useful and learned of all his valuable writings. Yes, I am justified in terming this work a very learned production, for it comprises an immense mass of information, deduced from almost every ophthalmic authority both at home and abroad. The labour incurred to collect, and the judgment required to select, the opinions of the numerous writers whose statements are referred to in this elaborate volume, are entitled to great praise. Perhaps, however, the work is too learned; at least I am tempted to regret that its talented author has not drawn more largely from his own abundant stock of knowledge—the knowledge his own acute observation and ample experience, combined with his capacity and habits of reflection, have enabled him to acquire. Society is deprived, I had almost said defrauded of a rich treasure, when a truly original and vigorous intellect expends its powers in compilation. What should

we not have lost if Hunter, and Abernethy, and Charles Bell, had merely collected with judicious care the opinions of the various authors who had particularly attended to the subjects which they subsequently investigated with such signal and splendid success? You will understand me, then, to say, that the amazing industry, profound learning, and vast research evinced throughout Lawrence's *Treatise on the Diseases of the Eye*, are among its humbler qualities.

Mr. Guthrie's elaborate Lectures on the Operative Surgery of the Eye were first printed in 1823; and as respects the small number of diseases of which they treat, may be said to consist of a most judicious and laborious compilation, joined to the product of his own great practical knowledge. We have no work in the English language which comprises a more full and masterly account of cataract and artificial pupil—an account in which the most learned and diligent compilation is very agreeably blended with useful original practical observations—than is contained in the elaborate articles devoted to the consideration of these two important subjects in these lectures of Mr. Guthrie.

This large book of Mackenzie's—his *Practical Treatise on the Diseases of the Eye*—was published three years ago, and as you may perceive, is most comprehensive in its plan and methodical in its arrangement. However, it contains much irrelevant matter—much information which is by no means pertinent to the subject its author professes to discuss; and, moreover, its material and comparatively trifling parts are placed too much upon a level. In endeavouring to communicate this equality of importance to the numerous and diversified branches of an extensive subject, its minor divisions are very generally exalted and discussed, as in the present instance, at the expense of those other parts which are of infinitely greater consequence. I shall

have occasion to refer to the opinions of Mr. Mackenzie so frequently in the course of these observations, that it would be mere repetition to engage in a prolonged analysis of the various sections of his voluminous treatise, on the present occasion. No one can be more willing than I am to admit the merits of this learned treatise, but I am bound to declare my firm conviction that it contains many, very many statements which its author would now be glad to have omitted, and I am confident it by no means comprises a sufficiently full, minute and detailed account of the many recent improvements which have taken place in the treatment of diseases of the eye.

The articles on the Diseases of the Eye in Cooper's *Surgical Dictionary* are very elaborate, and the information they contain is selected with great judgment. It is not necessary for me to say that these articles consist of a most learned and laborious compilation, and that, at the time of their first appearance, they furnished to the members of our profession a large and useful store of information which was previously, in a great measure, inaccessible to many of them. The great advantage of having the opinions of nearly every distinguished ophthalmologist collected together in so small a space was at once appreciated, and for many years the articles on the eye in this admirable dictionary contained the fullest, and at the same time, the most correct and authentic source of information on ophthalmic subjects which was to be found in the English language. But you will not forget that, during the last three or four years, Mr. Lawrence and Mr. Mackenzie have written large and valuable works on diseases of the eye, which have taken from these articles in Cooper's great publication the proud and merited pre-eminence they formerly possessed.

It is almost unnecessary for me to mention that in ad-

dition to the books I have just now briefly introduced to your notice many other large works on diseases of the eye have been published both at home and abroad, by which the science of ophthalmology has derived many material improvements. We are especially indebted to Langenbeck, Himley, Jaeger, Prochaska, Weller, Graef, Rust, Walther, Hesselbach, Hosp, Backhausen, Jacobson, Ammon, Juengken,* Baerens, and Clemens, for their contributions to this useful and interesting department of professional knowledge.

I do not profess, in this introductory discourse, to mention every individual by name who has assisted to place ophthalmic science in its present advanced position, for that would indeed be a laborious task, much less can I specially refer to those minor authorities who have contributed their feeble aid to the promotion of this *good work*. This is, however, the less necessary here, as, when discussing the various subjects comprised in this course of lectures, it will be requisite to direct your attention to the opinions of those who have paid particular attention to their details, and published, as the result of their observation and researches, any materially useful or interesting information.

Do not imagine that because ophthalmic science has recently made rapid advances, it is by any means perfect, and that it presents a barren field for the exercise of your ingenuity and the expenditure of your labour. Look at the improvements which have very lately been introduced merely in the treatment of ophthalmic diseases;—as, for instance, the use of strychnia in certain forms of amaurosis and ptosis; the application of the strong nitrate

* This author has published two large and highly meritorious works connected with ophthalmic practice—one on the diseases, and the other on the operative surgery of the eye.

of silver ointment in the cure of many acute and chronic diseases of the conjunctiva, and, more particularly, in such as are attended with a much increased discharge from that membrane; the employment of turpentine in iritis and inflammation of the deep seated textures of the eye; the administration of the sulphate of quina and iodine in various strumous inflammatory diseases of the eye, many of which were previously most improperly treated by mercury given to the production of ptyalism; the local application of the sulphate of cadmium in nebula and albugo of the cornea; &c.—and deduce from these cheering facts grounds of perseverance and sources of encouragement and emulation. It is certainly not in the power of all to communicate a great portion of information, but most of us may contribute a little, and, provided medical and surgical knowledge be augmented, whether by the aggregation of minute quantities or of a few larger contributions, its judicious diffusion will equally tend to lessen the sum of human calamity and lighten the load of sorrow and suffering so many of our fellow-beings are destined to sustain: and, I presume, I am not addressing any one this evening who is prepared to deny that this is, or ought to be, the paramount object of our professional exertions.

There are still three other books which I cannot omit to introduce to your notice. The first of these is the *Descriptio Anatomica Oculi Humani Iconibus illustrata*, of Zinn; the second is the *Icones Oculi Humani*, of Soemmerring. These two works are, in a great measure, confined to an anatomical account and a delineation of the eye, and for minuteness, fulness and accuracy of description, and fidelity and beauty of representation, have never been surpassed. As mere specimens of art, these engravings of Soemmerring are truly wonderful, and it

has rarely happened that the labour and skill of the anatomist have been so successfully supported by the perseverance and ingenuity of the artist. Here is a collection of papers on various points connected with the anatomy, physiology, and diseases of the eye—the *Scriptores Ophthalmologici Minores*, edited by Dr. Radius,—and it is indeed well worthy your careful study, when you have obtained an elementary knowledge of the subjects of which it so ingeniously and elaborately treats. It is in a great measure devoted to the investigation of what may be termed the minute anatomy, physiology, and pathology of the eye, and is replete with able and interesting essays on many abstruse and obscure points, which were previously very little understood. Many subjects which writers of large Treatises on the Eye, have generally appeared anxious to avoid, or, at least, solicitous to discuss with the most respectful brevity, are examined by the authors of these Essays with the utmost care and attention; and it must be admitted that they have, for the most part, grappled with the difficulties of their subjects in a manner which reflects the highest credit upon their diligence and learning. In short, this *collection of Papers* contains a mass of curious and useful information on many points which have been least successfully elucidated by the inquiries of preceding writers.

One of the most recent works composed by a professed *oculist*, is this book of Serny's; it is written by J. B. Serny, M. D., oculist, and was printed in 1809, and is exactly the sort of work you would expect an *oculist* to write. It contains none of the enlarged and comprehensive views of disease, and sound principles of treatment which distinguish the ophthalmological writings of Lawrence and Travers and Wardrop, but consists of confused and imperfect descriptions of some maladies, and an account of

their treatment, (little more than an enumeration of disgusting and useless or mischievous local applications), based on the narrowest and most contracted notions of pathology; such, indeed, as none but a mere *oculist* would or could have entertained.

I have here the work of Dr. Frick, Mr. Curtis, and some others, on Diseases of the Eye; and as I am confident you will not misinterpret the language of honest and temperate criticism, I do not hesitate to tell you that it is your duty, as economists of time, to avoid their perusal.

And now, Gentlemen, having troubled you with the preceding remarks respecting various works on diseases of the eye, I shall, during the remainder of our time this evening, only venture to detain you with a few general observations on the anatomy and pathology of the organ of vision.

As the textures of the eye are somewhat numerous, and, for the most part, very dissimilar, it cannot be presumed that the same morbific cause would be likely to produce an equal effect upon every part of the organ at one time, nor that when inflammation takes place, such inflammation will assume the same appearance and be influenced by precisely the same treatment when it arises in different situations. We find that an agent capable of inflaming one texture of the eye, has no injurious effect upon another, and we also occasionally find inflammation taking place, and passing through its various stages without at all implicating any texture in addition to that first affected; and, if we for a moment reflect on the great variety of textures composing the organ of vision, and their numerous, peculiar, and diversified functions, we cannot be surprised that its diseases are, (I, of course, admit the existence of many exceptions to this rule) as respects each other, so separate in their history, distinct in their appearance, variable in their progress, different in their

termination, and peculiar in their mode of cure and their disposition to limit their action. For these reasons, I have deemed it right to describe the diseases of each texture separately; intending, however, in the course of my observations, to notice that complication of morbid affection induced by the progression of malignant action, and, also, that combination of disease occasioned by the extension of inflammation from contiguity and its modification by constitutional agency; and finally, that simultaneous excitement of the textures of the eye generally, which sometimes occurs as an idiopathic affection, and which is termed, ophthalmitis.

In the prosecution of this intention, it will be necessary to select the most marked instances of particular diseases—to shew you, as it were, single and specific maladies of one individual texture, unconfounded and uncombined with those lesser affections of other and neighbouring parts which are so often associated with the original and more important malady when it has continued for a certain period; and here I may again remind you, that this participation in abnormal, and, more particularly, in inflammatory action, is especially prone to occur from the proximity of the various parts of the organ of vision, and from the existence of those anatomical relations which subsist between its respective textures and with which you are, I trust, well acquainted.

It may be mentioned that the human eye is composed of various membranes, which correspond in their anatomical characters to membranes of the same generic name in other parts of the body, and if, after its anatomy has been explained—after it has been explained to you that two of the humors of the eye were mere secretions and that the third possessed so feeble a degree of vitality that its organization has been frequently questioned, and that the

various textures of the eye respectively possessed, in their predominant characters, the qualities of mucous, serous, fibrous, nervous, and vascular membranes in general, and also that one of them—the cornea—was so dissimilar to any other tissue of the body as to be properly designated *sui generis*, you would feel very much surprised if I were to treat of the inflammation of these various dissimilar parts under the general term *ophthalmia*, limiting my description of the disease to the peculiarities of its *outward* appearance, and founding my opinion of its nature on the same circumstance; and you would, no doubt, feel convinced that such a mode of procedure was ill calculated to elucidate and unfold the phenomena presented to our notice by the more decided symptoms and peculiarities connected, as its distinguishing characters, with each disease; peculiarities which, it will be seen, are, for the most part, consistently accounted for by a reference to the anatomical qualities of its respective parts and the nature of their functions; and the same reasoning will equally apply to the other diseases of the organ of vision, not usually considered inflammatory.

Undoubtedly one of the greatest improvements in ophthalmic pathology is the establishment of the distinction of inflammation of the separate, the individual textures, of the eye. We now distinguish an inflammation of the eye not merely as it may be seated in a mucous, fibrous, serous, vascular, or nervous texture, but we also endeavour to discriminate those peculiarities in these inflammatory affections, which constitute the varieties of inflammation of any one of its textures. When the diseases of the eye were huddled together under the term *ophthalmy*, when a description of this *ophthalmy* was intended to comprehend and apply to nearly all the inflammatory diseases of the whole of its tunics, it is not very surprising that a confused, most

contradictory, and very uninstructive history of some kind of morbid affection was presented to the reader's attention. We have now, however, happily arrived at a much greater accuracy of diagnosis, and very properly discriminate the various forms of inflammation of the eye from each other, and distinguish the inflammation of one part from that of its neighbouring structures. But, as I have previously remarked, the proximity of the various textures of the eye to each other, their vascular connexion, and their functional and sympathetic associations, combine to render the extension of morbid action to many of these textures, an extremely probable occurrence during the progress of any acute inflammatory affection of the organ of vision.

In studying the pathology of the eye in that mode in which, in my opinion, it ought to be studied,—that is, by due reference to the anatomical qualities of the part diseased and the symptoms which attend and the other events and circumstances which accompany similar morbid affections of the same texture in other parts of the body,—you will bear in mind, that whether the mucous, the serous, or the fibrous membrane of the eye, or whatever texture of that organ may be affected, there are certain phenomena connected with the inflammation of such texture which may be said to be common to all structures of a like nature wherever situated; and these phenomena may be termed the common or general symptoms which are essential to any given morbid state of such textures, in opposition to other phenomena, which may be considered to belong to a specific disease of a particular texture.

If the diseased conditions of the organ of vision be not studied and classified in reference to the textures which enter into its composition, just as the morbid affections of other parts and organs are investigated and arranged, it will be absolutely impossible to obtain a proper knowledge

of very many of them, and a large proportion of those which are once understood cannot be remembered,—the assemblage of symptoms of which they consist cannot be associated with each other, nor connected with their appropriate designation, unless witnessed more frequently than practitioners generally have an opportunity of observing them. But, if the respective textures which enter into the composition of the eye are accurately distinguished, and their diseased states separately examined, a great part of the apparent difficulty and obscurity of the subject is at once removed and the task becomes comparatively easy of accomplishment. And it is only by following up the investigation of ophthalmic maladies in this manner that a much more accurate and extensive acquaintance with the subject than we at present possess can be expected to be acquired. The systematic method in which pathological anatomy is now cultivated, promises to dispel much of the mystery and confusion which formerly retarded the study, and rendered the diagnosis of disease so uncertain and difficult, and in no department of our profession has this improved system of inquiry and research induced greater advantages than in that which relates to the investigation of diseases of the eye.

After these explanatory remarks, you will be conscious that when I speak of catarrhal ophthalmia, I am adverting to inflammation of the mucous membrane covering the anterior aspect of the eye-ball and lining the palpebræ; and, again, when I allude to rheumatic ophthalmia, you will be aware that the strong fibrous investment of the transparent humours and delicate membranes is the seat of the malady. You will, in short, find the inflammatory diseases of the eye, at their commencement, limited, in many instances, to a particular texture, and exhibiting, for the most part, the same phenomena and passing through

the same changes as may be noticed when inflammation takes place in structures of a similar nature in other situations

Some of the textures of the eye intimately sympathize with the state and diseases of the constitution: for instance, the power of the retina is not infrequently diminished and sometimes even totally destroyed, during lactation; and great impairment of vision has been known to take place as a consequence of amenorrhœa. The iris may become inflamed as a result of syphilitic disease, of which, indeed, it constitutes one of the most painful secondary symptoms. Again, the sclerotica is very apt to become inflamed in rheumatic persons—it is a membrane of a dense fibrous structure, much resembling those fibrous textures which, in other parts, are chiefly obnoxious to rheumatic disease; and the inflammation which is usually designated rheumatic ophthalmia is, in fact, an inflammation of this fibrous tunic of the eye—the sclerotica. It has, as will be hereafter explained, peculiar characters and symptoms, and requires for its removal the administration of remedies adapted to the constitutional disease or tendency by which it is produced and maintained. This, then, is another instance of ophthalmic disease occasioned, and influenced in all its stages, by the condition of the constitution, and affecting generally only that part of the eye, the structure of which corresponds anatomically with that texture, which, in other situations, is the seat and is peculiarly obnoxious to, the same malady. You will find, too, that it is attended with a considerable degree of pain—a much greater degree of pain than accompanies inflammation of the conjunctiva; and this circumstance will direct you in your inquiries after the seat of various inflammatory affections to which the eye is subject. This has been differently explained by pathologists and physi-

ologists; but, as respects the sclerotica, I believe it is chiefly owing to the firmness of its texture, by which it is prevented from sufficiently yielding to the suddenly increased and rapidly increasing size of its blood vessels, and also to their incapacity to relieve themselves by effusion and secretion to the same extent as do distended vessels in other situations. This circumstance—that is the effusion and secretion of various matters from the inflamed part—is well exemplified in certain morbid states of the conjunctiva; whenever that membrane becomes acutely inflamed, the softness of its texture readily permits it to yield to the distention of its vessels, whilst their plenitude is relieved either by an increased flow of its natural secretion, by purulent effusions from its surface, by those effusions or depositions which occur in chemosis, or by the formation of pustules. Its immediate texture also admits of some deposition. The inflamed iris frequently occasions intense suffering, for it is a highly organized part, and possesses large nervous supplies, and besides its natural stimulus cannot be altogether excluded;—it will be excited, to a certain extent, by that stimulus which, in its healthy state, maintains the due performance of its functions. And its connexion with surrounding parts, their sympathy and very often decided implication in its morbid conditions, assist in giving rise to that acutely painful sensation and extreme intolerance of light so often noticed to exist in iritis; and to these sources of suffering may be added the tension of the external tunics from a sudden augmentation of the fluid contents of the globe.

It has been stated that the structure of the cornea is peculiar—that it differs from every other texture of the body and is therefore termed, *sui generis;* but there is a certain identity in its pathological conditions to those of other parts, in some of its component tissues; for instance,

its external or conjunctival covering, and the cellular membrane which connects its lamellæ to each other, are liable to morbid changes which preserve the characters of the diseased alterations those tissues undergo when situated in other parts. You will distinguish, therefore, the *general* from the *particular* pathology of this part, and remember that the lamellar texture of the cornea alone presents those anatomical and pathological peculiarities which have caused the structure of this tunic to be termed *sui generis*. And here I may mention, that although the external covering of the cornea possesses the characters of a mucous membrane, and its inner lining those of a serous membrane, yet they are both, in a certain degree, assimilated to the texture of the cornea; so that they do not, in fact, on minute examination, present in a well-marked form, the characters of the class of membranes to which they respectively belong. This deviation from the perfect purity of type exhibited by particular tissues, is noticed in many other parts of the body, and is one cause of that modification of disease which has contributed to render its diagnosis, in many instances, difficult, and its classification so proverbially imperfect.

When considering the diseases of the retina, it is important to bear in mind the predominance of its nervous over its vascular structure; it is a highly nervous part, and is therefore extremely liable to be influenced by those states of the system which particularly implicate the nervous system. And it must be remembered that it is expanded in a peculiar manner, for the purpose of receiving and transmitting the impression of luminous bodies. These, then, are some of the peculiarities connected with the retina which it is desirable to remember when studying its pathology.

You will sometimes find that after a patient has been

much reduced by mercury, and particularly if he be under its full influence, that he will be suddenly deprived of his sight, which will, probably, not return until the system be, in a great measure, cleared of that medicine and the strength restored by tonic and invigorating treatment. You are aware also that an undigested meal will sometimes induce blindness, which may continue until the stomach be emptied of its offending contents. During lactation dimness of vision will now and then occur, particularly if the individual has had several children in quick succession and continued to suckle them for a long period. I shall have occasion to point out to you, in subsequent lectures, particular instances in which the nervous textures of the eye have been seriously impaired and enfeebled by various physical and mental causes and especially by passions and emotions of the mind.

After having pointed out the sympathetic influence of the constitution upon the nervous textures of the eye, I may refer to the sympathy, the very close sympathy, which subsists between these organs under the existence of disease. If a particular texture of the eye become inflamed and continue inflamed for a certain period, and especially if the health become impaired, it will sometimes happen that the same part in the opposite organ will become affected with a similar malady. For instance, a person may have acute corneitis in one eye, and, from the character of the disease or bad management, it may remain, and after a time, the opposite cornea may become inflamed. And again, I often see individuals who are nearly blind from the effects of chronic iritis, which, being allowed to continue unchecked in one eye, has eventually occurred in the other and destroyed all useful vision. Of course the same thing takes place in respect to the maladies of other parts of the system, and is, so far,

an additional proof, that it is impossible to understand and successfully prosecute the study of ophthalmic disease by absolutely restricting our attention to this one branch of professional knowledge.

In explaining to you, at an early part of these observations, that the practices of mere *oculists*, their restricted views, and exclusive local treatment, were opposed to the correct management of diseases of the eye and to the increase of ophthalmic knowledge, I forgot to mention that nearly all the strictly constitutional affections of the organ of vision are scarcely at all relieved or in any way influenced by the use of eye-salves and collyria, and that it would be perfectly absurd to attempt their cure otherwise than by the adoption of the usual means for the removal of their cause, that is, the constitutional malady. If, for instance, gouty or scrofulous inflammation of the eye took place, no outward application alone would be at all likely to remove it, but if suitable local means were combined with medical treatment adapted to the morbid character of the constitution, then the alleviation of such disease may much more reasonably be expected to be accomplished.

And now, Gentlemen, before I close this address, permit me to say a few words respecting the propriety of giving a separate course of lectures at this institution on diseases of the eye, in the delivery of which I, as far as I understand my own motives, am influenced merely by a conviction of its utility. It remains for you to determine, by your attendance upon them, or otherwise, whether or not they will be continued; but I shall, under any circumstances, rest satisfied, that in giving you an opportunity of attending them I have discharged a duty I owe alike to the governors of this institution, to yourselves as medical students, and to the profession to which I belong.

I beg of you, then, not to furnish me with an apparent apo

logy for neglecting my duty. Prove by your attendance at lectures on diseases of the eye that your inclination, equally with the regulations of our medical corporations, urge you to acquire information respecting every part of the profession you are destined to practice.—Surely there is no one present who would be content with the mere attainment of that knowledge which will barely qualify him to procure—a diploma. An anxiety to obtain an enlarged and philosophical acquaintance with our profession, to extend the boundaries of medical knowledge, and to render it subservient to the relief of human suffering, involves motives of the highest order, and I will not affront you by comparing the pleasures derived from so pure and noble a source with the gratification arising from the mere pecuniary advantages connected with the exercise of such knowledge.

Although the necessity of obtaining a knowledge of ophthalmic disease is sufficiently recognized, and the inadequacy of acquiring such knowledge through the medium of the small number of lectures usually devoted to the subject in an ordinary course of surgical instruction, generally admitted, yet I am sometimes told that an acquaintance with the diseases of the eye comprehends so small a part of the objects included in a medical student's education, that he has scarcely any leisure for the cultivation of this subject, at least, so far as to attend a course of lectures devoted exclusively to its consideration. I should certainly be very unwilling to recommend any student to devote a great deal of time to the cultivation of ophthalmology, if I thought he was, by any peculiarity of circumstances, compelled to obtain his professional education in a very short space of time. I should certainly think it would be a lesser evil for such an unfortunate individual to be ignorant of the diseases of the eye, than to be

unacquainted with the morbid affections of organs, the preservation of the integrity of whose functions is indispensable to the maintenance of a state of health, and the treatment of the maladies of which, he would, in the ordinary course of practice, be more frequently called upon to undertake. Still ignorance upon this subject must be acknowledged to be an evil which, in its consequences, may be ruinous to the medical practitioner and most calamitous as respects his patients.

And then if we regard the influence of such culpable ignorance upon society, we shall find sufficient matter for censure and regret. If ignorance of ophthalmic disease on the part of a surgeon prevent him from averting the injurious effects of acute deep-seated inflammation of the eye, the evil is sufficiently great and the misfortune painfully severe, even if the subject of the injury happen to be wealthy, yet, in such case, the calamity, distressingly acute though it be, is generally mainly confined to the unfortunate patient; but, in the event of some contagious or epidemic ophthalmic disease becoming extensively prevalent, a want of knowledge on the part of the practitioner may become a source of immense injury to society, by securing the loss of vision to many of its poorer members, who, whatever may be their youth, and health, and vigour, are thus permanently thrown—absolutely and entirely cast—upon the benevolence of the community.

I leave it to the records of our profession to determine whether or not this is an exaggerated representation of the evils occasionally resulting from a slight and inadequate acquaintance with ophthalmic disease, on the part of medical practitioners, who have been suddenly and unexpectedly called upon to conduct its management when such disease has been unusually prevalent.

You may be told that a sufficient knowledge of diseases

of the eye may be communicated in a very small number of lectures—that, in short, the whole of the morbid affections of the visual organs may be sufficiently discussed and properly comprehended in ten or twelve lectures; but I may inform you that the course of instruction on ophthalmology, delivered by the celebrated Professor Beer, of Vienna, consisted of nearly two hundred lectures, and I may strengthen the effect of this statement by remarking that his discourses did not by any means constitute the whole of the ophthalmological series of lectures delivered at this justly celebrated school.

And, now, Gentlemen, having introduced myself to your notice in this somewhat rambling and discursive fashion, it only remains for me to thank you for the very great patience and attention with which you have been pleased to listen to me, and to promise, for the future, to prosecute the investigation of the subjects I have undertaken to discuss, in a more regular and systematic manner. I shall not indeed attempt to elicit your applause and obtain your confidence by a pompous parade of learning, but it will be my earnest wish, my anxious and constant endeavour, to communicate to you, in plain and intelligible language, those facts which it is proper and important that you should know, and an acquaintance with which I have myself acquired by diligent reading and great labour, and by the enjoyment of an unusually ample sphere of observation.

CHAPTER I.

ACUTE INFLAMMATORY DISEASES OF THE CONJUNCTIVA.

SECTION I.—SIMPLE ACUTE INFLAMMATION OF THE CONJUNCTIVA.

Syn. *Acute conjunctivitis.—Ophthalmia simplex.*

Preliminary remarks.—I have stated that I shall separately discuss the diseases of the various structures of the eye, and in carrying this intention into effect, I shall adopt the ordinary method of first investigating the maladies of its external and superficial textures, and shall then speak of the affections of its deeper-seated parts.

The external membrane of the eye—the conjunctiva—presents a surface of considerable extent, for it not only covers the entire anterior aspect of the eye-ball, but is reflected upon the whole internal surface of the lids. The mode in which the conjunctiva passes from the eye-ball to the palpebræ furnishes an admirable provision against the admission of foreign bodies to the back part of the eye, and materially promotes the facility of the movements of the palpebræ upon the globe. If the conjunctiva were not reflected from the eye-lid to the eye-ball, so as to form a sort of *cul de sac* at the line of reflection, extraneous substances would be very readily transmitted to the posterior surface of the globe, and would be very likely to excite inflammation of the orbital cellular membrane, which, as I shall afterwards explain, is a serious

and most painful malady. The conjunctiva is divided into three portions, named, from the parts upon which they pass, its corneal, its sclerotic, and its palpebral divisions:—these are mere distinctions of convenience, and are simply intended to assist the memory, to facilitate the acquisition of a knowledge of its anatomy and pathology, and to secure precision of language in communicating such knowledge to others. Now, although the corneal, the sclerotic, and the palpebral portions of the conjunctiva are but one continuous membrane, it must be remembered that that part of it which passes over the cornea is very delicate and transparent, and in it, the vessels which nourish the outer lamina of the cornea, ramify.

I shall say nothing more respecting the purposes to which the conjunctive membrane is subservient, for they are very numerous, and for the most part sufficiently palpable, but I may be permitted to direct attention to the importance of accurately noticing the various deviations in the characters of its secretion, which occur in connexion with the diseases of that membrane. With the qualities, the varied properties and the composition of mucus you are properly acquainted, and the mucous secretion of the conjunctiva does not appear to differ at all materially from that of other parts. In a state of health it is secreted only in such quantity as is required to facilitate the movements of one mucous surface upon the other, but under circumstances of disease its secretion may be much increased and greatly and peculiarly modified,—but I shall only at present direct attention to the fact in this general manner, for, I do not intend to stop for the purpose of defining and limiting the characters, the qualities, the varied properties of perverted secretion. The natural secretion of the conjunctiva, which in a condition of health is very scanty in quantity, may become much increased under the influence of disease, its characters

may become strangely and variously perverted, pus also may be secreted. The quantity of the secretion may be either diminished or increased—and an arid state of the conjunctiva is not merely a troublesome, but a very serious disease. On refering to dryness (great diminution not the absolute absence of the conjunctival secretion) of the conjunctiva your attention will very naturally be directed to the governing influence of the nervous system over the function of secretion. Thus, then, in the case before us, the importance of anatomy is peculiarly evident, for you will at once revert to the nervous supply of the conjunctiva in determining the cause of its deficient secretion. Here then is a morbid state of the nervous supply of the conjunctiva evinced by defective secretion, which cannot be remedied by any eye-washes and eye-salves which the most practised *oculist* can supply.

The conjunctiva from the mere nature of its texture is liable to those diseases which affect other mucous membranes, and is, from its situation, much exposed to external injuries, and to many of those injurious agencies which are prone to excite inflammation in parts possessing similar anatomical qualities. From this statement you will be prepared to expect that a great majority of its diseases are of an inflammatory nature and that many of them are attended with a change in the qualities and variation in the quantity of its secretion, and such is really the case, so that, in point of fact, nearly all its serious, acute, and important maladies, may be termed inflammatory. And the first of these diseases to which I shall call your attention is conjunctivitis—

Simple acute Inflammation of the Conjunctiva.—The condition of disease so designated is an acute inflammation, of the most simple kind, of the mucous membrane covering the anterior portion of the eye-ball

and lining the lids, not possessing any particular character occasioned by constitutional peculiarity, or any specific disease of the system.

Now what are the symptoms of this simple form of conjunctivitis? In the first place there will be a slight redness of the conjunctive membrane; increased lachrymation; some intolerance of light; a sense of dryness of the eye and uneasiness in moving the lids upon its surface; and also a sense of itching or a feeling as though sand or small gritty particles were insinuated beneath the palpebræ. Now, we will stop to review the etiology of the latter part of these various effects of excitement. In the first place, the dryness of the eye—the difficulty of moving the lids upon its surface—is owing to the diminution of the conjunctival secretion; the sensation as of minute foreign bodies beneath the lids, the itching or scratching (it may the one or the other as the conjunctival vessels may be more or less considerably enlarged &c.) sensation as it is termed by patients, arises from the projection of the vessels of the conjunctiva by which the absolute equality of the ocular and palpebral surfaces is destroyed; the increased lachrymation occurs from the sympathetic excitement of the lachrymal gland; and lastly, the slight intolerance of light takes place from the participation of the retina in the general excitement of the eye.

If the disease continues, the redness of the eye, which, at an earlier stage of the malady was caused by the simple enlargement of a few of its blood vessels, extends over its whole anterior surface as far as the margin of the cornea; the intolerance of light is much increased; the lachrymation is exceedingly profuse; and the uneasiness occasioned by the movement of the lids upon the globe, and the sensation of pricking or scratching is proportionately augmented. And finally, if the disease be now unchecked,

there will appear the symptoms of disease of other parts—perhaps of the cornea, the sclerotica, or the iris—which may have participated in the inflammatory condition of the conjunctiva.

Such is an outline—I may say, a mere enumeration of the more prominent symptoms, and of the progress of simple acute conjunctivitis, but it will be necessary to examine them more in detail.

Redness.—The redness of the conjunctiva is of a bright scarlet colour, and is, at first, most considerable at the periphery of the eye-ball; the enlarged vessels become tortuous in their course, and more diffuse in their ramifications as they approach the cornea; they project from the surface of the membrane in which they are situated, and may be readily moved in connexion with that membrane upon the sclerotic surface beneath. You will remember that when the conjunctiva alone is inflamed, however acute such inflammation may be, its vessels stop at the margin of the cornea, and that the whole of it presents one uniformly red, and vividly and intensely red, surface—at all events, there is no distinctly formed zonular arrangement of its vessels at the edge of the cornea, so as to be clearly defined in its outline, and distinguished from the general redness of the conjunctive membrane.

Pain.—With respect to the uneasiness produced by moving the lids upon the eye-ball, that is more particularly distressing at an early stage of the disease, for after a time, the conjunctiva appears completely to resume its secreting function, and thus the dry uneasy feeling formerly produced by a suspension or material diminution of this secretion, is either much lessened or altogether removed. But still there is pain in moving the lids. You know that in a natural state of parts, the palpebræ are frequently and rapidly moved upon the globe with so much ease and freedom that

we are frequently unconscious of the movements, but under circumstances of disease, the performance of a natural function and healthy action is often a source of pain, and, in the case under consideration, the quick and often spasmodic motions of the lids upon the globe occasions great uneasiness when the conjunctiva is in a state of inflammation. You will distinguish, therefore, a sense of suffering produced by the friction either of inflamed parts upon each other, or of a healthy surface upon an inflamed one, from the uneasiness, the mere uncomfortable feeling, arising from a diminution or suspension of the conjunctival secretion. The uneasiness complained of on moving the palpebræ upon the globe at an early stage of the disease is owing to a suspension or diminution of the conjunctival secretion—the suffering occasioned by the same description of movement at a subsequent period of the malady results from the friction of one inflamed surface upon another, combined with the increased susceptibility, the augmented sensibility, of surfaces so circumstanced, to the transit of the tears over them, and sometimes also from an increase in the temperature of the lachrymal fluid.

Lachrymation.—Increased lachrymation attends every stage of acute conjunctivitis, and the tears are not only increased in quantity, but altered in quality; they seem to be much hotter than in a state of health, and to have acquired certain irritating properties. But, of course, the inflamed state of the surface of the eye over which they flow will cause them to communicate to the patient a sense of heat much more considerable than that they really possess; and, again, the redness and the eruptive state of the cheeks over which they pass, so commonly noticed under these circumstances, may be less owing to the changed qualities of the tears to which these effects are generally attributed, than to that irritability of the patient's system which is likely to attend the established acute form of conjunctivitis.

Extension of Disease.—Acute conjunctivitis may occasion inflammation of other parts, and will then be characterized by the symptoms which belong to the new affection. There may be acute inflammation of the subconjunctival cellular membrane, indicated by extreme chemosis—inflammation of the cornea, shown by its nebulosity and loss of polish—inflammation of the sclerotica, declared by an aggravation of pain, increased intolerance of light, and tension of the eye-ball—inflammation of the iris, marked by those decided symptoms which are connected with that form of disease; &c.

Effects or Modes of Termination.—The disease may degenerate into a chronic form—it may give rise to vascularity, opacity, or ulceration of the cornea, and, in short, by originating new maladies, it may constitute the first and also the remote cause of the various effects of the more acute and important affections of the eye, which will be discussed in future lectures. The constitutional symptoms connected with or produced by simple acute conjunctivitis will vary with the degree of severity of the local inflammation, and the constitutional character of the individual in whom it takes place. A certain amount of disturbance of the stomach and bowels, pain in the head and more or less general febrile irritation, are usually present, but all these symptoms differ so much in their grade of intensity in different instances, that it would be tedious and difficult to mention them in detail or describe them at all minutely, and it would be altogether unnecessary to do more than direct your attention to the fact of their occurrence under the circumstances I have already pointed out.

Diagnosis.—The only disease of any other parts of the eye with which acute inflammation of the conjunctiva is liable to be confounded is, sclerotitis. You would distinguish the disease under consideration from inflamma-

tion of the sclerotica *by the colour* of its vessels, which, you know, are bright scarlet, whilst those of the sclerotica are of a purple appearance;—*from their situation*—they are placed *upon* and *within* the conjunctiva, and may be moved with it *upon* the eye-ball, those of the sclerotica are deeper seated, the conjunctiva may be moved upon them, whilst they only follow the movements of the eye-ball;—*from their arrangement*—they are first perceived at the periphery of the eye-ball, and are most abundant there, those of the sclerotica are first observed near the margin of the cornea; and finally the vessels of the inflamed conjunctiva are less direct—more tortuous—than are those of the inflamed sclerotica.

In saying that the vessels of the inflamed conjunctiva are first perceived at the circumference of the eye-ball, and subsequently extend to and ramify around the margin of the cornea, I ought to mention that this is usually noticed, but sometimes the progress of the disease is too rapid, —the symptoms of the affection are established too suddenly—to furnish us with an opportunity of doing more than just notice that the largest vessels and the greatest number of them are placed at the periphery of the globe at an early period of the malady. When the disease is fully developed in its most acute form, the conjunctiva presents one uniformly and equally red surface, or rather, it presents a vividly bright vermilion appearance. You will also distinguish inflammation of the conjunctiva from sclerotitis by other symptoms, for, in the latter disease, the dryness of the eye-ball, the uneasiness produced by moving the lids upon it, and the pricking or scratching sensation as though sand were beneath the lids, is either not noticed or scarcely at all perceived, whilst in conjunctivitis, these symptoms are present to a distressing extent; and, on the contrary, the pain, the sense of tension and intolerance of

light, are peculiarly severe and annoying in inflammation of the sclerotica, whilst they scarcely provoke the slightest uneasiness in conjunctivitis.

I have already told you that inflammation of the conjunctiva may extend to the sclerotica, and it is right that you should be informed that although I am describing the diseases of each texture of the eye separately yet you will not always find them so limited in the course of your practice; but if I were not to adopt this plan, you would be quite unable to comprehend and distinguish the numerous maladies to which the organ of vision is liable. If I first describe the symptoms of each form of disease of the separate textures of the eye, and subsequently point out those which are usually associated with its more common combinations of morbid affection, you will be prepared, I trust, when you witness such combinations of disease to attach to each malady the symptoms which belong to it—to select the symptoms connected with separate maladies and attach to each of them their proper share in producing the aggregate disease, so as to distinguish the predominant affection, and educe the comparative date and severity of each. I repeat, then, that when the conjunctiva is acutely inflamed, the sclerotica is very liable to participate in the disease, chiefly from its contiguity and the vascular connexions subsisting between these parts; and in such case you will be able to distinguish the various circumstances connected with the colour, situation, arrangement, and so on, of the two sets of vessels, with all the advantages of contrast. In such an instance it will be scarcely possible to confound the moveable, prominent, scarlet vessels of the conjunctiva, with the fixed, purple, covered vessels of the sclerotica.

Having said so much respecting the means of distinguishing the inflammation of the conjunctiva from that of

neighbouring parts, it will only be necessary, in order to complete the subject of diagnosis, that I should just mention that the other varieties of conjunctivitis are distinguished from that under consideration, by the quality or quantity of the discharge proceeding from the inflamed surface or by other sufficiently distinctive symptoms, so that they are only liable to be confounded by an extremely ignorant or a culpably inattentive person.

Prognosis.—The prognosis of acute inflammation of the conjunctiva will always be favourable so long as other textures are not involved, the patient in a pretty good state of health, and in a condition to bear the requisite treatment. But if the health is much deranged, if the constitutional symptoms run high, if other parts have become involved, or if the patient be incapable of bearing, or unwilling to submit to, the necessary remedial measures, the prognosis will be more or less unfavourable. In very many instances of this disease which fall under our care, (and in its slighter forms it is more frequently witnessed than any other variety of ophthalmic malady), the symptoms are speedily removed by the judicious application of a few simple remedies, without leaving behind any impairment of vision or any injurious effect whatever.

Causes.—What are the causes of conjunctival inflammation? I have told you that the condition of the conjunctiva is much influenced by the state of the constitution—that it is liable to the maladies which affect mucous membranes in general, and that it is peculiarly exposed to external injuries and to the operation of many sources of mechanical irritation.

In reading some books on diseases of the eye, you will find that many pages are occupied in detailing the causes of inflammation of the conjunctiva, and I am satisfied that you may be readily excused for rising from the perusal of

such works with a conviction that it is no easy matter to determine what is *not* a cause of inflammation of this texture. I shall only attempt to classify the more important of them.

It is most necessary to bear in mind that many of what are termed the exciting causes of ophthalmia are by no means adequate to produce the disease in the absence of a particular state of health. You will see very many persons engaged in the same employment, whose eyes are exposed to the same source of irritation, and yet only a small proportion of the individuals thus exposed will suffer from ophthalmia; and so with respect to disease of other parts, there is required a certain state of health—an aptitude on the part of the constitution to permit the efficient influence of the morbific agent—in order that the local disease may be developed. It is to such a state of system, a state of system predisposed to the reception of diseased action, that my remarks more particularly apply; and a system so situated in reference to the organ of vision may be considered to constitute a predisposing cause of ocular inflammation.

Let me take a familiar illustration of the distinction between a predisposing and exciting cause of ophthalmic inflammation, as exemplified in performing the operation of extraction upon a subject duly prepared for the operation, and one in whom such preparation has been neglected. A person of a full habit, with furred tongue, and disturbed stomach and bowels, may require an operation for the extraction of the lens. The surgeon to whom he applies for this purpose perhaps neglects to lower the system, and to correct the faulty state of the bowels, and performs the operation without the ceremony of delay. Under these presumed circumstances what is likely to happen? Why, the operation will be very probably quite

successless. Acute inflammation will take place, which will be maintained by the faulty state of the constitution, and the eye will perhaps either be much injured or totally destroyed. But had due precautions been adopted in the management of the case prior to the operation, although the same amount, the same kind and degree of local injury had been then inflicted, although the eye would have been exposed to the same *exciting* cause of disease, either no acute inflammation would have followed, or none which remedies would not have decidedly controlled. That is, presuming the operation had been, in both instances, equally well and properly performed. Such, then, is an illustration of what are termed the predisposing causes of inflammation of the eye, and having drawn attention to the principle on which they operate in producing such an effect, I need not stop to point them out in detail.

Various sources of mechanical irritation give rise to conjunctivitis, such, for instance, as working in apartments in which a great quantity of lime, metal or other dust is floating—and also the vapours of various substances at which different artisans are employed. Again, inequalities of the palpebral conjunctiva, inversion of the eye-lashes, tumours at the edge of the eyelids, &c., are occasional causes of acute conjunctivitis; and so also are, exposure of the eyes to sudden alterations of temperature, and to the influence of a cold, moist, atmosphere as in windy, rainy or sleety weather. And then, again, certain employments have a tendency to excite conjunctivitis, such as those of tailors, shoe-makers, engravers, working-jewellers, gilt-toy makers, &c., and more particularly if such avocations are followed by artificial light.

Tumours situated near the tarsal margin are very liable to excite inflammation of the conjunctiva, and, as I have elsewhere explained, such inflammation will be exceed-

ingly obstinate and perhaps altogether incurable until the tumour is taken away. Many and many a time have I extirpated such tumours where the eye has been inflamed, and although the cases may have been under treatment several months previously to the operation, the ophthalmia has often subsided on the removal of the tumour without the application of any eye-wash or the use of any remedy whatever.

I am aware that if a *large rough* tumour existed *quite* at the tarsal margin, or if a tumour *projected* the palpebral conjunctiva, or grew from its surface, and excited acute conjunctivitis, the cause of the malady would be too obvious to be overlooked and the necessity of its removal at a proper period would be sufficiently apparent; but you will not always be prepared to concede an equally injurious agency to a tumour which is not situated *very near* to the tarsal margin, which is neither *large* nor *rough* and *unequal* upon its surface, and which does not give rise to any *appreciable inequality* of the palpebral conjunctiva, and it is with a view of preventing this one source of disappointment, to which you will otherwise be liable in the course of your practice, that I am desirous of pointing out the necessity of removing tumours of the eye-lids, when acute ophthalmia exists and which refuses to yield to the usual methods of treatment. Tumours in the eyelids which, neither from their size, their situation, their form, or the character of their surface, appear, *a priori*, adequate to excite ophthalmia, are, in some instances, subsequently found to possess such capacity, so that, I repeat, when inflammation of the eye exists in connection with a tumour in the palpebra, it is desirable to remove such tumour if the ophthalmia be obstinate or frequently relapse, unless indeed some more evident and decidedly efficient cause of the malady be present.

I saw a lady some time ago who had been suffering from repeated attacks of ophthalmia, and on carefully examining her eye when she first called upon me, I discovered a small tumour near the margin of the cornea, covered by the conjunctiva, I divided the mucous membrane, and there immediately escaped a small vesicular body, which I suppose had caused the ophthalmia, inasmuch as the lady had no relapse of the disease after its removal.

To prove how necessary it is to examine such patients most carefully as may be suffering from acute, obstinate, or frequently recurring attacks of ophthalmia, I shall relate the following case. A young man received what he termed "a lash from a thorn-branch" upon the eye, which produced some ecchymosis and swelling of the lids. The gentleman who attended him adopted such measures for his relief as he considered to be necessary, but the inflammation continued violent and the pain severe, and he then called upon me—it was at this period perhaps a week after the accident had taken place. I found the upper lid a good deal puffed and the eye much inflamed, and prescribed such remedies as I then deemed advisable. I saw this person again in a few days; the eye was scarcely at all relieved by the plan of treatment I had recommended, and he greatly complained of a scratching beneath the lid; taking therefore this fact into consideration in connexion with the swollen and puffed state of the superior palpebra, and the nature of the accident, I conjectured that some foreign body was lodged beneath the upper eye-lid, I therefore carefully raised it, and, just in the sulcus where the conjunctiva is reflected from the eye-lid to the eye-ball, I saw a small thin twig about the eight of an inch long, which, of course, I removed. This twig had been no doubt, so situated from the time the

accident to the eye took place, and had occasioned the obstinate and painful inflammation from which he had so severely suffered, for, on its removal, the inflammatory symptoms were also removed.

A few weeks ago Mr. H.——brought his child to me with a slightly inflamed state of the left eye, which had proved very obstinate. I suppose it was on account of the obstinacy of the case that I was requested to see it, and that I was desired to examine the part very carefully. I told the gentleman that it was unnecessary to ask me to do that, and I thought I had duly complied with his particular request, or rather with my own custom in such cases, but the next time the child came to me, I removed a hair from near the tarsal margin, which had escaped my observation when I first saw her. It grew from beneath the palpebral conjunctiva near to the tarsal margin, and was very light coloured, and extremely short and delicate. Of course the hair capsule was misplaced, and the bulb of the eye-lash was, in consequence, misdirected. In this instance, the eye-lash which had occasioned so much trouble, was so small, that I had great difficulty in getting my forceps to touch it, so as to remove it, and Mr. H. himself could not see it until I had placed it upon a sheet of white paper. I mention these errors of mine for your benefit and I sincerely hope none of you will commit so many blunders as I have done.

Although many of the causes of conjunctival inflammation are sufficiently palpable, yet, in many cases, we are really at a loss to determine the cause of the malady; persons whose habits are regular, whose health is good, and who have committed no deviation from their usual cautious and temperate mode of living, will now and then retire in their ordinary health, and rise in the morning with an inflamed state of the eye; and many people call upon us

with inflamed eyes who can give so little account of the cause of their malady that they are compelled to say, in the absence of a better reason, that they have taken cold, which, you know, accounts, in their estimation, for the origin of every malady otherwise unaccountable.

I remember a Lecturer who, after having enumerated rather a tiresome catalogue of causes of a particular disease, inadvertently declared that it sometimes came on without any cause at all, meaning, of course, if you will allow me so to explain this *lapsus linguæ*, without any detectable cause, and I may tell you the same with respect to the cause of many cases of acute conjunctivitis. But you will always ascertain the cause if you can, for, its detection will not only give a character of propriety to your treatment, but will also often communicate to it, prompt and successful efficiency.

Treatment.—You will remember I am about to speak of the treatment of pure, simple acute inflammation of the conjunctiva—I shall not just now direct attention to the management of chronic conjunctivitis or to the relief of those symptoms which characterize the unchecked progress of acute inflammation of the conjunctiva.

The first thing I shall beg you to notice is the constitutional condition and habit of your patient—surely you would not treat a strong plethoric person as you would manage a delicate puny individual, for, an activity of treatment which would kill the one by its severity, might, from its mildness, scarcely take an appreciable effect upon the other. Ascertain, I repeat, if possible, the constitutional condition of your patient, remembering that many uterine, gastric and intestinal affections, and so on, often cause the disease, and that remedies directed to the removal of their derangements, will sometimes be alone adequate to accomplish the cure of the inflamed eye.

We will suppose that acute inflammation of the eye take place in a strong healthy person, that the inflammation is very violent, but has as yet extended to no other part. Now, here, it would certainly be desirable to bleed —to take blood from the arm, or by cupping—and perhaps you might afterwards—a day afterwards—direct a few leeches to be applied just below, that is, very near to, the margin of the inferior palpebra. You might then apply a blister behind the ear, if one eye only is inflamed, or, if both are diseased, you would prefer to place it at the back of the neck. At the same time you would direct the eye or eyes to be bathed frequently with warm water; and also, several times in the course of the day with goulard water, or, if there is much pain, you might prefer a strong aqueous solution of opium, or a decoction of poppies, or a fomentation of hops, or a solution of the extract of hyoscyamus. At the same time you would prescribe a little blue pill and colocynth, with a small quantity of tartarized antimony, or if you wish to prostrate the powers of the system very much, you may administer digitalis or colchicum, or you may select and adapt some active purgative—such as scammony, elaterium, gamboge, &c.,—which you may consider best suited to the habit of your patient and the particular circumstances of the case. Perhaps the disease will be much diminished by the adoption of these measures, so that, in a few days, you may be able to substitute a little zinc lotion, or a collyrium, composed of a drachm of the vinum opii to an ounce of water, instead of the goulard lotion; and, to continue the subject of local applications, you may, if the case still go on favourably, use the nitrate of silver drops, in the proportion of two grains to the ounce of water, or the undiluted vinum opii, as your concluding applications.

Now, this method of treatment appears brief and simple

enough, but you must not despise it on that account; we will, in this instance, be content with simple remedies for a simple disease. But, although this plan of treatment appears so very simple, I can tell you it will often comprise all that is required to complete a cure, but I shall speak more fully of these matters at our next lecture, which will be, in a great measure, devoted to a full consideration of those remedial agents, which are most commonly employed for the subduction of ocular inflammation —such, for instance, as bleeding, counter irritation, stimulating applications, collyria, &c.

I think you understand that, inasmuch as inflammation of one part of the eye is particularly prone to extend to other parts of that organ, it is highly necessary to arrest its progress as soon as possible, so that if a patient, a strong person, for instance, were suffering from mere conjunctivitis, which proved obstinate, you would take the usual means of lowering his system—you would bleed, give nauseants, and employ active purgation—and of course, reduce the diet, and, as a general rule, allow no stimulating beverage of any kind. The eyes, of course, should not be much exercised and the patient should wear a green shade or what is better, as being at the same time a convenient mode of applying cooling lotions to the eye, a small square bit of linen which may be tied round the head with a piece of tape. You would further recommend a darkened room.

People call upon me sometimes with inflamed eyes—poor people I mean—and when I ask what remedies they have used, they very generally reply, with the fullest confidence in the propriety of their proceedings, that they have rubbed the eye with their fasting spittle, or bathed it with their urine, or with tea, or applied a poultice to the part; such are a sample of the disgusting, inefficient, or in-

jurious remedies, which have acquired popular reputation; and perhaps I may find that at the height of the inflammation they have put a blister close to the palpebræ, the effect of which, when you reflect on the continuity of surface presented by the cutaneous and mucous aspect of that part, you may pretty correctly appreciate.

Acute inflammation of the eye was formerly treated rather curiously by practitioners generally. You will be told by one old author to apply leeches to the nose, to the anus, and to other parts; which method of practice is founded on some vague notions of derivation; but, if an epistaxis, or bleeding piles have ceased to annoy an individual as they have been accustomed to do, and if, in consequence of such suspension of an accustomed evacuation, the eye has become inflamed, you had better make an issue in the arm and use active purgatives; and so with respect to the drying up of an ulcer which has been accustomed to discharge—to the absence of an eruption which has been accustomed to appear:—but this only brings us back to a statement made at an early part of this lecture, namely, that you must diligently search after the cause of the ophthalmic complaint, and treat such cause of ocular disease just as you would do, if it really did not occasion any affection of the eye. But I need not go over this matter in detail, for it is sufficiently manifest, that if there be any evident cause of irritation, such as the presence of tumours, the inversion of one or more eye-lashes, the intrusion of foreign bodies beneath the lids, &c., such source of irritation ought to be removed. And it is equally evident, that if the sudden retrocession of a cutaneous eruption, the rapid healing of an ulcer, the suppression of a discharge, &c., to which a person has been for a long period accustomed, should take place, and give rise to acute inflammation of the eye, some mode of reproducing

the original discharge, or of re-exciting the cutaneous irritation, or some artificial substitute for the one or the other should be at once had recourse to, and should form an early and prominent part of the treatment. The formation of an issue or seton, or the use of some irritating ointment or liniment, constitute the most usual and convenient means of carrying these objects into effect.

It has been represented that an inflammation, originally commencing in the conjunctiva, may, in its progress, extend to other parts, and especially to the subconjunctival cellular membrane, and that, by the further extension of the inflammation, it may remotely produce, as its effects, a great majority of the morbid affections to which the different textures of the eye are liable. I shall not now, however, enter upon their consideration, for, in fact, these occasional effects of an extension of inflammation from the conjunctiva to other parts, constitute distinct, and sometimes primary diseases, and will be discussed when we consider the pathology of the particular texture in which such extension of disease may exist; but it would be advisable to point out to you, at this period, the different forms of chemosis, or inflammation of, with effusion into, the subconjunctival cellular membrane, because it very frequently takes place in a slight degree even in the simple acute form of conjunctivitis, and is an invariable attendant on its more severe varieties, such as purulent and gonorrhœal ophthalmia.

Chemosis is, in fact, a diffuse inflammation of the subconjunctival cellular membrane, attended with an effusion of serum, pus, lymph or blood, or of several of these depositions combined, but I am aware that it has sometimes been confounded with mere subconjunctival echymosis, œdema of the subconjunctival cellular membrane, &c., by some writers whose pathological knowledge is by no

means remarkable for precision. I have received a note from a surgeon at L——, brought by a patient to my house this day, stating that he had sustained a blow upon the eye, which was immediately followed by great chemosis, &c. I need scarcely tell you that what this surgeon termed chemosis was simply the effusion of blood beneath the conjunctiva, such as you may frequently see in the eyes of children who are suffering from hooping-cough, or who have been the subjects of violent sickness. BANISTER knew the disease very well, and tells his readers (see his work, published in 1622,) that "the conjunctiva, or white of the eye, is sometimes so swolne, that it goeth forth of the eye-lids, and is redde and shining;" he further remarks, "chemosis is, when the membrane called conjunctiva is lifted higher than the cornea, as if this were in a hole, &c." He treats of it as a distinct disease, with which he appears to be well acquainted. It is discussed at great length by the laborious ASTRUC (tom. ii. p. 1099), and the learned SAUVAGES (tom. ii. p. 65). It is called by WARE a thickening of the conjunctiva (p. 11), and by WENZEL (Manuel, &c. p. 168) a swelling of that membrane. MR. TRAVERS speaks of chemosis as an effusion of lymph, by which the conjunctiva acquires a solid augmentation of bulk (p. 96). The laborious SCARPA considers chemosis to consist of "a quantity of blood effused into the cellular membrane, which connects the conjunctiva to the anterior hemisphere of the eye; in consequence of which the conjunctiva becomes gradually elevated upon the eye-ball, and projects towards the eye-lids, so as to conceal within it the cornea, which appears as if it were depressed." (P. 169). I mention to you the opinions of WARE, and WENZEL, and TRAVERS, for the purpose of impressing upon your minds the necessity of acquiring precise notions—correct and exact ideas—of the pathology of the various

parts of the eye, so necessary to the adoption of judicious treatment for their relief or removal. You will understand, then, that chemosis is not merely a swelling and thickening of the conjunctiva, as stated by WENZEL and WARE, nor a simple deposition of lymph, as represented by TRAVERS, nor an effusion of blood, as explained by SCARPA, but that, in fact, it comprehends many and varied pathological conditions, of which the able authors, to whom I have just directed your attention, have each of them mentioned only one. Inflammation of the conjunctiva is only connected with chemosis inasmuch as it often gives rise to inflammation of the cellular membrane beneath and is projected by the effusions such inflammation produces, except that *its* inflammation, the enlargement of *its* vessels, and deposition within *its* texture, assist in producing the chemotic swelling.

Chemosis is of two kinds, the active inflammatory and the mild inflammatory, or the lymphatic and the œdematous chemosis. The former is, of course, its severest form, and occurs in connexion with acute inflammation of the conjunctiva in strong plethoric subjects, It is distinguished by its firmness and the greater degree of uneasiness it excites; and you will find that it consists chiefly of enlarged blood-vessels and lymph effused into the cellular membrane by which it is connected with the sclerotica. The mild inflammatory chemosis, on the contrary, occurs in feeble persons, or in connexion with a milder degree of conjunctival inflammation; it is loose and flabby in its texture, it is larger, more extensive and diffuse, than the preceding variety, and extends generally so far over the cornea as nearly to conceal it entirely. It is attended with scarcely any uneasiness, and, if it be examined, it will be found to be composed chiefly of serous effusion into the cellular texture immediately beneath the conjunctiva.

These varieties of chemosis differ in degree—for instance, there may be merely a tumid condition from enlargement of vessels, or there may be, in addition, a slight or a more considerable amount of serous infiltration into the cellular structure connecting the conjunctiva to the sclerotica; or the chemosis may chiefly consist of a deposition of lymph into the cellular web just mentioned. I shall not enlarge upon this subject by alluding at all in detail to the changes occasionally wrought in the conjunctiva, by the continuance or organization of the lymphatic portion of active inflammatory chemosis; but you will be aware, from your knowledge of general pathology, that deposited and partially organized lymph undergoes various subseqent changes, which constitute a source of interesting investigation to the zealous pathologist.

Let me for a moment allude to the object which the effusion termed chemosis is intended to fulfil, to the effects it sometimes produces, and to its treatment. The inflamed conjunctiva has a mode of relieving itself externally by various secretions, as I have previously mentioned, and it possesses also the means of lessening the plenitude of its vessels, and consequently of limiting its inflammatory excitement, by effusion from its sclerotic aspect; which effusion, in conjunction with other occurrences, is termed chemosis. This deposition separates the inflamed membrane from the sclerotica and from the margin of the cornea, and in this way generally prevents the extension of inflammatory action to those parts; but if the chemosis continues, there is frequently produced gangrene of the external layers of the cornea, either from an excessively inflamed state of that portion of the conjunctiva which covers and supports it, or from the strangulation of those vessels which pass to that part and thence to the cornea. This incipient gangrene is very likely to spread in a part

so feebly organized and so unfavourably circumstanced as the cornea, when in a state such as has been described; and, accordingly, the whole of that tunic not uncommonly sloughs.

The treatment of chemosis, (in addition to that adapted to the removal of the inflammation, of which it is frequently an effect,) will consist in the application of leeches immediately above the eye-brow, the employment of alum and zinc lotions, the use of the nitrate of silver drops, and the free scarification of the swollen part. This operation is best performed in the following manner:—request an assistant to elevate and evert the upper lid, and, standing in front of the patient, depress the inferior palpebra with the fingers of the left hand; (that is, presuming the chemosis is not so extensive as to project between the eye-lids), you then draw an instrument, similar to that employed by Mr. Wardrop, carefully, though not very slowly, along the surface of the tumid conjunctiva. With an instrument of this kind you need not be apprehensive of scarifying too deeply, for the effusion in the subconjunctival cellular membrane will prevent the risk of injuring the sclerotica, and it will be quite necessary to divide the conjunctiva completely, for, without such division, you can neither effectually relieve its tension, nor completely sever many of its enlarged vessels, nor sufficiently discharge the least consistent portion of the effused fluids. If you employ a lancet or an instrument brought to a sharp point, you will be likely to inflict a good deal of unnecessary pain. You cannot divide the swollen part at all rapidly, for its point will occasionally dip deeply into, and become entangled in, the conjunctiva; neither can you divide it equally, regularly, and safely, for, in some parts of the incision the conjunctive membrane will be scarcely even scratched, while in other situations it, and the cellular

membrane beneath, will be very freely severed, and the sclerotica also may be injured. In spite of every care that may be employed, if a sharp-pointed instrument be used, you will be liable to divide the chemotic surface and texture, in a slow, interrupted, and irregular manner. The small instrument suggested by Mr. WARDROP,* the cutting edge of which has a convex outline, is therefore far better than a lancet for this purpose.

Before I conclude, allow me to repeat that the means of subduing simple acute inflammation of the conjunctiva, and the principles to be acted upon, with a view to effect this object in cases where the inflammation is severe, and does not arise from any outward source of mechanical irritation, are chiefly—1.—To lessen the general fulness of the system and the power of the circulation; 2.—To diminish the vascular plenitude of the inflamed part; 3.—To rectify any disordered state of the health, and particularly any derangement of the alimentary canal, that may exist; 4.—To employ counter-irritation in the neighbourhood of the disease; 5.—To remove heat by the local employment of various collyria, or relieve pain by means of anodyne and soothing applications, or promote vascular contraction by the use of suitable stimulants or appropriate astringents; 6.—To protect the eye from the influence of vivid light, and especially not to allow of active vision by artificial light.

* This instrument was employed with great advantage by MR. FORBES, for the scarification of the mucous lining of the lids, in the acute form of purulent ophthalmia which prevailed in Edinburgh Castle in 1807.—(*Edin. Med. and Surg. Journal, vol. iii. p.* 430.)

SECTION II.—ON THE MORE IMPORTANT REMEDIES USUALLY EMPLOYED FOR THE SUBDUCTION OF OCULAR INFLAMMATION.

At our last meeting we gave an account of the symptoms of acute ophthalmia,—simple acute inflammation of the conjunctiva,—with a description of its treatment, which we distinctly stated to consist of a few simple remedies, in addition to the removal of the cause, whatever might be its nature, which originated the malady. We especially referred to various deranged conditions of particular parts or organs of the body, and to many sources of mechanical irritation as among the more common of these causes, and endeavoured to point out how frequently the latter part of these causes was overlooked or insufficiently attended to; and, it will be remembered, that several cases were related as having occurred in my own practice, in which tumours near or at the tarsal margin, inversion of one or more eye-lashes, &c., had occasioned a troublesome and obstinate inflammation of the conjunctiva, which was only curable by the removal of the source of irritation. But I endeavoured to direct attention to the fact, that when such defects existed and were overlooked, it was no t where they were present in their most palpable and severe forms, —for example, it would be difficult to omit the detection of several inverted large dark-coloured eye-lashes, or the existence of a considerable tumour quite at the margin of the eye-lid, which might give rise to inflammation of the conjunctiva, but it would require vigilant and attentive examination, and some experience of the subject, to ascertain the existence of one or more minute, delicate, light-coloured ciliæ, or to determine how far, a *small* tumour, situated near the edge of the eye-lid, might be competent

to excite conjunctival inflammation—how far such inflammation, if present in conjunction with a small tumour placed near the palpebral margin, might be merely *coincident with*, or *produced by*, the tumour. I remember to have stated as a rule for the guidance of your practice under such circumstances, that if the inflammation were obstinate, if it were little influenced by the usual treatment, if it frequently relapsed, and if no other cause of the inflammation could be detected, it would be right to extirpate the palpebral tumour, even though it might, from its form, its size, the character of its surface, and its distance from the tarsal border, appear to be, in the abstract, incompetent to excite irritation.

I shall not at present enter into an elaborate investigation of the causes of ocular inflammation in general, as it will be necessary to speak of the cause of the inflammation of each separate texture as we proceed, and I am anxious to make each part of our subject as complete as possible in itself, so that by the aid of the illustrations I shall be enabled to bring forward, you will, I trust, have no difficulty in following my descriptions of each disease, and connecting with such descriptions the other parts of its history, and the treatment it may require. We shall, however, avoid many repetitions by discussing at the present stage of our progress the merits of the more important of the remedies usually employed for the subduction of ocular inflammation, for there are many *general* remarks respecting them which it is quite necessary to make at some part of this series of observations, and of course, they cannot be made at any period with more propriety, than at its commencement.

Loss of Blood.—Bleeding is one of the most important agents employed for the subduction of ocular inflammation, and I shall endeavour to give you some information as to

the mode in which this should be accomplished, the time at which it should be adopted, and the extent to which it should be practised. If you employ a wrong mode of removing blood you may excite an unnecessary degree of pain, provoke a needless amount of inflammation, and effect scarcely the slightest benefit; if you bleed at an improper period of the disease you may practise an unrequired or an injurious operation; and lastly, if you commit an error with respect to the extent to which you carry blood-letting, you may either produce an unnecessary degree of debility, protract treatment, or allow the prejudicial influence of the disease to prevail.

It was formerly the practice to bleed in the foot for the removal of inflammation situated at the upper part of the body, on the principle of revulsion; and many persons, at the present day, who entertain an opinion that inflammation of the eyes frequently depends on suppressed discharges, are in the habit of harassing the part which has ceased to discharge as usual, on the supervention of ophthalmia, believing that to be, what they term, the most natural mode of cure. You will find such persons directing the application of leeches to the anus, if the eyes are inflamed, and an habitual hœmorrhoidal discharge is suspended; to the nose, if the customary epistaxis has ceased to be as frequent and considerable as usual; to the labia, if the menses are suppressed; and to the neighbourhood of old ulcers, if they have healed, or if the discharge from their surface has diminished in quantity. Such are the means employed by those surgeons who believe that the inflamed state of the eye sometimes depends on these various causes, and is best relieved by restoring the absent or deficient discharge, or by instituting some artificial drain from the part, whence such discharge usually or naturally proceeds. If you act upon such pathological notions, do not let your

attention be withdrawn from the at least equally necessary and more active part of the treatment.

Having stated that one of the chief points to be secured in the treatment of acute ophthalmic inflammation, is to lessen the fulness of the vascular system and diminish the power of the circulation, you will imagine that it cannot be of much importance *as regards the mere subduction of the disease*, from what situation blood be removed for this purpose. There are, however, many reasons why bleeding in the arm is the more desirable mode of withdrawing blood, when we require the abstraction of a large quantity. If you open the jugular vein, you greatly annoy the patient by the constrained position in which it is necessary to place him during the operation, and until the bleeding orifice is closed; and, frequently, you cannot obtain the quantity it is desirable to procure. If you open the temporal artery, it is probable also you may be disappointed, or, on the contrary, you may find it difficult to restrain the hœmorrhage, unless you employ tight bandages, or some mode of compressing that vessel which will be uncomfortable to the feelings, and heating to the head of your patient; besides, it is remarked, that after the temporal artery has been opened for the relief of acute inflammation of the eye, the neighbouring arterial branches have assumed a hœmorrhagic action, such as is noticed in other situations after the current of blood has been suddenly and abruptly prevented from pursuing its direct course. This fact has been fully determined, and clearly and forcibly illustrated by Mr. Wardrop, in his able surgical lectures.

There are circumstances which may render it advisable to abstract the quantity of blood you may require, by means of cupping; for instance, a patient may be unusually fat; the veins in the arm may be extremely small and obscure; or, as is sometimes the case, he may have an insuperable

objection to permit the opening of a vein; generally speaking, however, cupping is the best means of secondary bleeding—of withdrawing blood after arteriotomy or phlebotomy has been performed—and at a certain stage of the disease combines, in the range of its effects, the influence of depletion and counter-irritation. You will not discover many objections to bleeding from the arm, when it becomes necessary to remove blood, for the purpose of relieving inflammation of the eye;—it is convenient for the patient and the surgeon; it is an operation easily performed; it occasions very little pain; the hœmorrhage can be readily controlled, without a necessity for uncomfortable bandaging; and you may obtain, from a proper orifice, any quantity of blood you may deem it requisite to abstract. Dr. Vetch, who strongly advises one large bleeding to the production of syncope in all cases of acute inflammation of the eye, says, "the salutary effect of syncope I can only ascribe to the laxity of the vessels rendering them unable to resume their former tone and state of excitement; and it is only as far as we hold this specific effect in contemplation, that venæsection is to be regarded as a principal remedy in the treatment of ophthalmia. The strength and fibre of the patient may be reduced by abstinence and repeated bloodletting to the lowest standard without producing any material benefit, or insuring the organ against the destructive consequence of the further progress of inflammation." In discussing the question of bleeding, in acute inflammation of the eye, Mr. Lawrence says, "the quantity of blood to be drawn from the arm must be such as will decidedly influence the circulation. We cannot determine the amount beforehand; we cannot decide that ten, twelve, or sixteen ounces will be sufficient; it may be necessary to take twenty, thirty, or forty ounces, or to produce syncope, if you cannot otherwise make the requisite impression on

the vascular system. After having quoted the opinions of Dr. John Thomson and Langenbeck upon this point, the same author proceeds to state "that it is the usual practice in France, Italy, and Germany, to take a small quantity of blood at a time, and to repeat the bleeding frequently; thus, venesection is not unfrequently performed night and morning for several successive days. This plan, which is adopted from the fear of injuring the patient by a large bleeding, drains his circulating system almost to the last drop, brings on excessive debility, and is less efficacious in arresting the local disorder. I have no hesitation in stating, that the object last mentioned is effected much more certainly by a large bleeding in the outset, and that this method accomplishes it at less expense to the constitution. I never saw a person injured by a single large bleeding performed for an active inflammation; while generally the strength is completely restored in twelve or twenty-four hours, even after bleeding to syncope. On the contrary, weeks and months often elapse before patients, who have been drained by repeated bleedings, recover their strength." (P. 106.) "In taking away blood from the arm," says Mr. Mackenzie, "in any inflammatory disease of the eye, the opening should be made large, so as to ensure, if possible, a considerable effect on the impetus of the circulation. The quantity removed will vary from ten to thirty or forty ounces, according to the constitution of the patient, and the circumstances of the disease." (P. 323.)

Having made a decided impression on the system by general bleeding, you may perhaps consider it necessary to apply leeches, for the removal of what may be termed a second or diminished degree of inflammation; a dozen leeches may be placed just beneath the tarsal border of the lower eye-lid, and in this way you may obtain a con-

siderable quantity of blood. There are, however, certain objections to the use of leeches in this situation which it is proper to mention—they occasion an injurious exposure of the inflamed eye to light, unless applied with more care than is customarily made use of by those whose proper business it is to apply them; they also often give rise to an unpleasant degree of swelling and ecchymosis of the lids, especially if the patient possesses an irritable skin, or an unusually great susceptibility of constitution; and they sometimes cause, in children particularly, a troublesome hœmorrhage, which seriously alarms the patient and his friends. On account of the ecchymosis and inflammation sometimes occurring around leech-bites, Dr. Vetch recommends that they should be placed at a distance from the inflamed eye, not upon the eye-lids, but upon the *septum narium*. I rarely advise the application of leeches to the upper lid, never indeed where the conjunctiva merely is inflamed, but, I sometimes recommend them to be placed just above the eye-brow, or at the side of the nose, or at the external angle of the eye, because, when so applied, sanguineous infiltration is less likely to occur, owing to the small quantity of cellular membrane in those situations as compared with the more central parts of the palpebræ.

There are surgeons who profess to derive great advantage, by scarifying the inflamed conjunctiva, (I am not now speaking of chemosis) they divide the numerous large vessels you may discover on everting the lids, by repeated incisions with a lancet; and, of course, you may in this way, induce a pretty copious discharge of blood; but, as might be imagined, these incisions by destroying the smoothness of the mucous surface, as, also, by the direct and immediate injury they inflict, give rise to great pain and uneasiness, and in the majority of instances, produce an extent of secondary inconvenience more than

equivalent to the immediate relief to be obtained from them. This method of removing blood is not, certainly, a very consistent mode of diminishing inflammation of a part so delicately formed and peculiarly circumstanced as the interior of the eye-lids, in reference to the freedom and frequency of their movements upon the eye-ball. The practice is, however, sanctioned by many excellent surgeons, and among others by Professor Beer, Mr. Ware, Mr. Forbes an experienced army surgeon, and also Mr. Mackenzie.

It was formerly rather a favourite practice to rub the everted surface of the eye-lids with "barley beards," with a view of lessening their vascularity, by puncturing the conjunctiva and thus abstracting a quantity of blood from the part immediately inflamed—you will not be surprised to learn that this barbarous mode of scarifying the conjunctiva has been discontinued. This method of practice was introduced by Woolhouse, and was warmly eulogized by Platner. Prior to his time it was usual to perform the same operation by means of a common thistle, a steel rasp, pumice stone, and even by the aid of agents of a still coarser and more irritating nature.

It must be understood that no directions you can receive from books or lectures, will enable you to decide upon the quantity of blood it may be necessary to withdraw in every case of acute inflammation of the textures of the eye; there must be a demand, a very great demand, on your own judgment; I cannot tell you that the loss of so many ounces of blood will be necessary to subdue a certain degree of inflammation of the conjunctiva, and that the abstraction of so many more or less number of ounces will be required to remove inflammation of the sclerotica, and so on, with regard to the inflammation of the other textures of the eye. However, the following directions comprehend the rules which regulate my own practice;—

you must be guided by the effects of bleeding upon the constitution, as well as by its influence upon the eye; you must bleed repeatedly in a very short space of time, if symptoms are severe; for, as I may again remark, unless you abridge the duration of acute inflammation, unless you check its progress with promptitude, interstitial deposition may take place, and you may experience the disappointment, and your patient may sustain the injury, of recovering the form of the eye perhaps, but with the loss of the transparency of its pellucid textures, after having cheerfully submitted to that treatment, which, if carried a slight degree further, would have perfectly preserved both its figure and its transparency.

Purgatives.—We employ purgatives in this class of diseases with the intention of lowering the plenitude of the system, or for the purpose of rectifying deranged conditions of the alimentary canal, or of maintaining its healthy state. Now, in some cases, we are solicitous to maintain merely a slight action upon the bowels throughout the whole course of our treatment; in other instances, we are desirous of thoroughly clearing out the alimentary canal by one or two strong doses of some active or drastic purgative; and again, in other cases, we wish to promote a copious discharge of liquid evacuations.

It is not necessary for me to mention the particular drugs which fulfil these various intentions, but I may as well point out, by way of illustration, some of the cases in which these different modes of employing purgatives, are required. One or two liberal doses of some active or drastic purgative may be required, where an attack of ophthalmia has followed an obstructed state of the bowels consequent on the ingestion of some unwholesome food. A course of mild aperients would be useful where a slight degree of ophthalmia exists in connexion with, and appa-

rently having a certain dependence on, a mere torpid state of the bowels. And lastly, it might be desirable to promote free liquid dejections where ophthalmia occurs in a strong plethoric subject, whose secretions are naturally scanty, and more particularly if there be present any hydropic tendency.

Mercury.— We employ mercury in ophthalmic diseases where we only desire to obtain its purgative or its mild alterative effects; and also in cases where we wish to excite gradual and slight, or prompt and active, ptyalism. I shall have occasion to point out the existence of various affections of the eye, in connexion with certain deranged states of the health, for the removal of which states of health we should very probably suggest the use of alterative doses of mercury even if no disease of the eye was present, but which is much more distinctly required when the two affections are associated.

The slight and gradual mercurial influence is more commonly required for the removal of many chronic diseases of the iris, the membrane of the aqueous humor, the crystalline capsule, the hyaloid membrane and septa of the vitreous humor, the choroid, and the retina; and its more prompt, complete, and active influence is usually demanded, in the acute inflammatory affections of the deep-seated textures. I shall not have occasion to say much about mercury at present, whilst treating of the diseases of the conjunctiva, but when I speak of the inflammatory states of various other textures of the organ of vision, it will be necessary to discuss its merits somewhat in detail, and we shall then take occasion to inquire at what period after the continuance of disease of its internal structures, which has led to the impairment or loss of vision in consequence of the deposition of lymph, this excellent medicine ceases to be useful—how soon after its secretion the

deposited lymph becomes so far organized or identified with surrounding parts, as to be no longer obnoxious to the influence of mercury; for you will be aware that inflammatory products sometimes acquire, by continuance, an established vitality—a degree of organization which renders them capable of resisting the sorbefacient operation of hydrargyrus.

Nauseants.—We employ nauseants as a remedial agent in ophthalmic inflammation for the purpose of lowering the force of the circulation, and superseding the necessity for removing that immense amount of blood which, in some acute affections, would otherwise be required in order to prevent the impairment or loss of vision. The tartarized antimony, in small doses, is the nauseant I generally employ, but seldom at the earliest stage of an acute ophthalmic inflammation, lest it should excite vomiting, which, until bleeding has been practised, is likely to do mischief by favouring the injection of the vessels of the eye. This, and other nauseating medicines, are used in small doses after blood-letting has been practised, and chiefly for the purpose of keeping down the circulation, to effect which, might otherwise require a much further loss of blood. On this principle Mr. Saunders employed nauseants for the cure of acute purulent ophthalmia in adults. Sir W. Adams, on the contrary, deserting the reasonable and scientific views of his preceptor, employed emetics, so as to maintain active vomiting for eight or ten hours, with the intention of changing the action of the vessels engaged in the inflammatory process, and for this notable discovery he claimed a pecuniary recompense from the government of his country. (*Med. and Phys. Journal*, vol. xxix.)

Tonics.—Tonics are more especially required in strumous disease of the eyes, and in some cases of impaired vision connected with an enfeebled state of the system.

I took some credit to myself for having, as I thought, directed the attention of the profession to the utility of the sulphate of quinine in certain strumous inflammatory affections of the eye, and particularly in inflammation of the iris and membrane of the aqueous humor, when attended with constitutional symptoms, which I, at the same time, attempted to point out. My remarks were at first neglected; I afterwards brought the subject again before the profession, and employed, as a useful medium for the purpose, as may be remembered, the *Medical Gazette;* I suppose the evidence I adduced in support of my opinions was pretty conclusive, for their accuracy was then admitted; but it then appeared for the first time that the matter had been determined before by some one else. However, I put this question at rest by examining the work to which such distinct reference had been made, (and in which, it was said, the recommendation I had given as though it were something new, had previously appeared,) and proving that its author had by no means anticipated my views and opinions. The editor of the *Medico-Chirurgical Review* now comes forward to say that the sulphate of quina is quite inferior to steel and many other tonics. (For July, 1833.) I shall give myself no anxiety about his criticism, though I am by no means insensible to the praise of that talented and impartial journalist, persuaded that the value of my recommendation, obtained, as you know it has been, from a large field of practice, will eventually be acknowledged. I am most solicitous to impress upon your minds the value of this class of remedies, and have only referred to this trifling controversy as a means of arresting your attention, and engaging your especial contemplation of a highly important subject, which I might not otherwise have effected in an equal degree. The comparative merits of

various tonics will be mentioned when I consider the diseases to which they are respectively applicable.

Some time ago I had a boy under my care, whose case presented a very beautiful and gratifying illustration of the efficacy of the sulphate of quina in removing scrofulous inflammation of the eye—those forms of inflammation of certain parts of the organ of vision, which, as far as I remember, until the publication of my opinions, were treated by the liberal administration of mercury. The case occurred in the person of a boy (Reuben Pears) who had been under the care of my lamented and excellent friend, the late Dr. Darwall, and it was at the Doctor's request that I undertook the management of his case. The little patient was very decidedly scrofulous, having light hair, blue eyes, thin fair skin, and tinted cheek, and being marked by great delicacy of organization. This child was dreadfully emaciated, from repeated salivations; and when under the influence of mercury, the ophthalmic complaint was in no respect improved. The eyes were as nearly lost as possible when I first saw him, for there was great inflammation of the cornea, of the membrane of the aqueous humor, and of the iris,* yet he eventually recovered his sight in a sufficient degree to follow his father's business (which was that of a brass-founder), although, during the treatment of his case, I gave him no mercury whatever, but cured him by the use of the sulphate of quina. As soon as he was able to face the light, and open the eyes pretty freely, and had, at the same time, regained his strength, the cornea was found to be very opaque, so that his friends, despairing of his recovery, though his sight was daily improving, had

* The result of the case and the effects of the disease pretty clearly indicate that the inflammation commenced in the cornea, spread to the membrane of the aqueous humor, and subsequently extended to the iris.

him instructed in music, as a means of earning his subsistence without the aid of vision, or, at all events, without the assistance of perfect vision. I encouraged them, however, to use, and to continue the use, of the oxymuriate of mercury drops, and they were willing to employ them so long as I considered their application likely to be serviceable to him, and he is now, I may say, after having continued to apply them regularly in the evening for two years, a useful member of society. If his eyes are attentively examined, there may be perceived, 1.—*a pretty extensive nebula of the cornea*, proving that inflammation of that texture had formerly existed; 2.—*slight discoloration of the iris and irregularity of the pupil* may be remarked, indicating the former existence of iritis; 3.—*a somewhat irregularly dotted appearance of the capsular portion of the membrane of the aqueous humor* may be discovered, exhibiting the remains of inflammation of that beautifully delicate and perfectly pellucid texture. Can it be denied that the sulphate of quina is capable of arresting inflammation of the iris and cornea, even when they have proceeded to the development of some of their worst effects? This fact may have been explained by others long ago, for aught I know to the contrary, but I can only say that, after very diligent examination of the works of nearly every distinguished ophthalmological writer of modern times, I have not been able to find any distinct allusion to the circumstance—any allusion which would properly lead to the inference, that the sulphate of quina was ever to be employed or relied upon, or was intended to be recommended, as a means of curing iritis and corneitis, when they were as fully developed as in the instance I have just related.

Counter-irritation.—We now proceed to the consideration of counter-irritation, and as my experience in the

management of affections of the eye has caused me to place great reliance on its powers, I shall solicit your best attention for a short time to my remarks on this very useful and interesting part of the treatment of ophthalmic diseases. We shall first speak of the best mode of employing counter-irritation; and secondly, endeavour to demonstrate the most judicious time for its employment; and lastly, point out its most appropriate situation. The most usual modes of effecting counter-irritation are, by irritating the skin by various stimulating liniments and unguents; by impairing or destroying its vitality by the aid of moxa and different caustic substances; or, by inserting some foreign substance into a wound made with a surgical instrument, as is exemplified in the seton and issue.

The advantages connected with the use of blisters are, the speed with which they operate; their convenience of application; and the quick subsidence of their effects when no longer required to remain, on the application of any mild ointment. If however the patient possess an irritable skin, or be subject to attacks of erysipelatous inflammation, if it be desirable to maintain counter-irritation for a long time, or if former experience has proved that they are likely to affect the urinary organs, it would in such cases be advisable to adopt some other mode of effecting your object.

There are many surgeons who are extremely partial to the mode of irritating the skin by frictions with liniments and ointments, but the effects of such applications are exceedingly uncertain; in many cases they will produce no effect whatever, while in other instances, they will excite the most intense inflammation and even superficial sloughing; besides they are generally a long time before they produce their effects,—your patient may *rub* for many days before he produces any useful influence upon the skin.

There cannot be too much caution employed in the use of irritating plasters, ointments and liniments, particularly when prescribed for young persons, and directed to be applied near the head and face. The application of tartarized antimony plasters above the eye-brow, has, in several cases which I have been requested to visit, produced permanently mischievous consequences, besides giving rise to a state of inflammation and sloughing which has even threatened the loss of life.

In the course of my practice I have very frequently effected great benefit, at a certain stage of many acute inflammatory diseases of the eye, by the aid of setons and issues, and, as they are easily made, and formed without occasioning much pain, as they are conveniently dressed, and are perfectly manageable as to the increase or diminution of their size, and as they combine a moderate degree of counter-irritation, with a salutary amount of discharge, I have not seen advantages in the more recent discoveries, to alter my opinion of their utility, or to induce me to prefer them, for the cure of this class of diseases, to remedies, whose value has been decidedly ascertained.

You will imagine that a remedy for a disease like advice needlessly given, or too perseveringly obtruded, may be out of season, and in fact, there are few remedies, so greatly mismanaged as regards the time of their application, as counter-irritants; persons will often come to you with their eyes most acutely inflamed, with a blister upon the forehead or temple, or even upon the eye-lids, and they will tell you with a foolish face of astonishment and chagrin, that the blister you ordered them on a former occasion when their eyes were inflamed, cured them, but that now it has increased their sufferings. Undoubtedly, much depends on selecting the appropriate period for their

employment, and it will be remembered, that in *acute* inflammation of the eye, they are never to be used, as a *first* application, and are never to be placed *very near the affected organ, until the inflammation has been considerably reduced.* You may prescribe blisters (presuming the inflammation of the eye to be of an acute character) after ample venæsection has been premised, and you may repeat them if the acute symptoms are merely diminished; or, if it be desirable, either from the lingering nature of the disease, or an obvious tendency to a relapse, you may form an issue in the arm or temple, or insert a seton at the back of the neck; but on this subject I shall speak more fully, when considering strumous disease of the eyes.

With regard to the situation in which it may be most desirable to employ counter-irritants, you are aware, that it is usual to apply a blister at the back of the neck, or behind each of the ears, after bleeding has been practised, and that it is desirable afterwards to place them nearer to the seat of the disease—you may, in fact, put one over the eye-brow, or eye-brows, as you may have one or both organs affected; or, if you prefer it, upon the temples; or if the second or subacute symptoms evince a disposition to be lingering in their duration, a more permanent form of counter-irritation, such as an issue in the arm, may be necessary. This is indeed a most convenient situation for the purpose; the issue does not, or scarcely at all, disfigure the arm, and is so conveniently managed by patients, that they rarely complain of the trouble of dressing it, and, it may be added, that so great, so palpably evident, are the benefits conferred by a small issue of this description, not only upon the eye, but also upon the general health, that persons will often be as unwilling to have them healed as they were formerly reluctant to permit their formation. I have had children and adult patients—numbers of them—under

my care with relapses of ophthalmia, and although I have suggested the formation of an issue, as a means of preventing their recurrence, they have sometimes objected to permit its insertion, but have eventually been obliged to submit, and I have not often had them under my care afterwards;—at least, for the same description of disease. So far then it is not our *interest*—if it were possible to practice a profession like ours in a purely commercial spirit—so far, I repeat, it is not to our advantage, to recommend them, but I am persuaded there is no one present who would be willing to urge the permanently curative tendency of a remedy as an argument against the propriety of its use. When an issue is placed in the arm of a scrofulous child for the cure of an attack of ophthalmia and allowed to remain as a means of preventing, or of lessening the tendency to, relapses of this troublesome disease, it will sometimes happen that there will be no discharge at all from it,—it will be quite dry; at other times it will matter so freely that it may be necessary to remove the dressings two or three times during the day. And as the child grows up, and acquires strength with the attainment of adult age, it will sometimes be difficult to keep the issue open, without employing very powerfully stimulating and irritating applications. Where the secretion from the issue is so variable, so very capricious, it is tolerably clear that there is a great necessity for its continuance, and that at those times when it discharges most profusely there would be likely to take place a recurrence of ocular disease if no issue had been formed, or if there had not existed some artificial drain, or some similar channel by which the system might be relieved from its morbid imbuements. I apprehend that where the issue or seton (whichever may be employed) is disposed to heal, and where, as the individual advances in life it ceases to discharge, or can scarcely be made to

secrete, if, at the same time, no relapse of ophthalmic inflammation has taken place for a long period, there is no decided necessity for its continuance—in fact, it may be allowed to heal; but where it has been suffered to remain several years, it would be desirable to notice most carefully the effect of its closure upon the system, to lower the diet, and to promote the action of the skin and the bowels by suitable diaphoretic and aperient medicines, for, at least, a few weeks afterwards.

As it will be necessary for me to revert to the subject of counter-irritation occasionally, whenever it may be requisite to mention the adaptation of this remedial agent to particular forms of disease, I shall not extend my observations by pointing out in detail the description of case suited to each remedy of this class, but content myself with thus directing attention to the subject in this general manner, in the hope of impressing upon your minds the high value of this class of remedies.

Local Applications.—We now proceed to speak of those local applications which are intended to abstract heat from the inflamed part, diminish vascular fulness, or allay irritation and sooth pain; and here let me not be understood to advise any one of the collyria and other applications, to be presently recommended, to be persevered in to the exclusion of any other from which the patient experiences a greater amount of relief. You know the intention they are designed to fulfil, and you know also that if they are painful on their first application, or after a short trial, and are not succeeded by relief, they cannot be serviceable and therefore ought not to be continued. You are too well aware of the varied susceptibilities and peculiarities—the diversified sensibilities of different individuals, to expect that any one remedy or application will be universal in its adaptation. In this instance then, you will bend to circum-

stances, and not obstinately adhere to any one remedy to the exclusion of others, which may, in particular instances, possess greater advantages.

You know that formerly the management of diseases of the eye, was, in a great measure, confined to the use of eye-washes, but we now attach to them comparatively little importance, and I shall endeavour to divest them of those unmerited claims to notice, which some of you may feel disposed to think they possess.

There is a long account of many strange local applications employed for the relief of diseased eyes in the large work of SAUVAGES; but I shall not occupy your time by mentioning the names of these ridiculous and disgusting remedies;—as a specimen of their value, I may state that in looking over an old book a few days ago, I perceived the question seriously debated as to whether the white or dark part of hen's dung was to be preferred for the cure of a diseased eye. BANISTER mentions that some surgeons consider the following eye-water to possess miraculous qualities; "they bury," says he, "vipers in doung, whereof are ingendred wormes, which they distil, and put this water into the eyes;" and SCARPA strongly recommends, as local remedies for inflamed eyes, "bags of mallows boiled in new milk, or a poultice of bread and milk with saffron, the pulp of roasted apples, and others of that class;" he also states that, "in order to moderate the excessive heat which is felt in the eyes, nothing is more advantageous than introducing with the point of a probe between the eye-lids and ball, the white of a fresh egg, or the mucilage of the psyllium prepared in the distilled water of mallows." (P. 174.)

When there is much inflammation of the external part of the eye, without any great discharge, I generally recommend the common goulard water, applied warm, or, if

there be much pain, a strong decoction of poppies, or an aqueous solution of opium or hyoscyamus—but some persons find nothing agree so well, or communicate so much relief, as copious ablution with tepid water. You may commence, then, with goulard water; as the symptoms are relieved, you may try the zinc lotion (2 grains to the ounce), and, at a later stage of the disease, you may employ the wine or the tincture of opium, or the nitrate of silver drops, (2 grains to the ounce of water). When the conjunctival inflammation is attended with a great discharge, you may commence with an alum lotion, or some other simple astringent, but remember, mere local astringents, whatever may be their nature, do not often constitute the material part of the treatment. I might go on enumerating a great many substances which possess astringent properties, and I might largely dilate upon their respective qualities, and talk much about their comparative merits, but, remember, I am not professing to do this, but rather to direct your especial attention to principles of treatment. You must view the subject comprehensively, as well as in detail—you must study it as destined general practitioners rather than as intended oculists.

With respect to the mode of using these eye-washes, you may direct them to be applied either warm or cold, as your patient's feelings and the effect of the remedy may determine. And they may be applied to the eyes by means of a soft piece of sponge or linen, but, remember, no active friction should be applied—the sponge or linen should be occasionally wet with the lotion, and kept in contact with the eyes—or, if you wish the lotion to be more certainly and durably applied to the surface of the eye, you may fill the small eye-glass, and invert it upon the part, for it is so formed as to surround the globe, and adapt itself to the orbitar margin

Stimulants and Escharotics.—These remedies are scarcely ever employed, except for the relief of disease of the superficial parts of the eye. They are, of course, likely to aggravate many of its internal inflammatory affections. The solution of the nitrate of silver, the vinum opii, and the sulphate of copper, are most frequently used in my own practice. The escharotics most commonly employed are, the nitrate of silver and the sulphate of copper in substance. The former is very extensively useful, and is sometimes advantageously employed for the purpose of destroying the surface of an irritable ulcer of the cornea, and the latter is pretty generally used as a means of removing a vascular, or a granular and vascular, condition of the lids.

Evacuation of the Aqueous Humor.—Mr. Wardrop proposed to relieve the pain and tension which generally exists in some of the more severe forms of acute inflammation of the eye, by puncturing the cornea and evacuating the aqueous humor.* Mr. Wardrop's suggestion was carried into effect by Mr. Ware, Mr. Macgregor, and Mr. Fielding, and by Mueller and Langenbeck, in some cases of acute purulent ophthalmia, with great advantage. This practice has, however, never come into general use; it is not recommended by Professor Rosas, Mr. Lawrence, or Mr. Mackenzie, or scarcely any modern writer of reputation, on diseases of the eye. I have given Mr. Wardrop's plan a full and fair trial, but am by no means prepared to speak favorably of its effects. The operation itself is exquisitely painful in the circumstances under which it is proposed to be performed, and its good effects are exceedingly transient, for the aqueous

* Dr. Whyte and others had previously suggested the same mode of relieving that tension of the globe which sometimes exists when acute ophthalmia is present.

humor, when once discharged, is most rapidly reproduced. The necessary exposure of the eye during the performance of the operation, and the direct injury inflicted by the incision, combine to render this mode of treatment very objectionable, and it appears to me that it is more likely to do harm than to confer benefit, when practised at any stage of acute ophthalmic inflammation prior to the secretion of pus or the deposition of lymph. BENEDICT chiefly recommends the incision of the cornea and evacuation of the aqueous humor, as a means of relief in iritis and inflammation of the chambers of the eye, associated with purulent secretion or lymphatic deposition. He says "uti sæpius in hydrope paracentesi peracta diureticis sanitatem restituere valent medici, ita etiam in hypopii tam gravis gradu ex puris evacuatione tantum salus erit speranda." (P. 120.) MR. WARDROP'S opinions on the mode of evacuating the aqueous humor, and on the diseases or pathological states of the eye requiring or benefitted by the performance of this operation, are contained in the third volume of the *Edinburgh Medical and Surgical Journal*, and in the third and tenth volumes of the *Medico-Chirurgical Transactions.*

Shading the eyes.—Shading the eyes is highly necessary in many ophthalmic diseases. In cases of ectropium and epiphora, we accomplish this object by recommending our patients to wear blue or green spectacles. In slight inflammation of the conjunctiva, we advise the patient to hang a piece of linen before the eyes, which combines the advantages of not merely moderating the light, but of enabling us to keep the organs cool by applying our lotions to the linen suspended before them. In deep-seated inflammation this is still more necessary as a mode of impeding the access of light to the excited part. But, I cannot too earnestly dissuade you from permitting persons to bind

a handkerchief or a thick piece of linen tightly upon the eyes, as a means of more effectually excluding light from those organs, for, by so doing, the inflammation must be increased. The eyes are in this way much heated, and I need scarcely tell you what will be the effect of pressing two inflamed surfaces together. The mere pressure will excite great irritation, and the contact of the lid with the eye-ball will have the effect of confining a quantity of heat which would otherwise escape. You will understand then, that the object of wearing the linen shade is to modify the degree of light which is permitted to pass to the eye, and to furnish a useful medium for the application of lotions to the inflamed organs. As to the extent to which it may be necessary to prevent the access of light to the eye, that will vary with the nature of the inflamed part and the degree of inflammation it may be suffering. If the conjunctiva be merely slightly inflamed, it may only be necessary to wear a green shade, but if, on the contrary, acute retinitis exist, then it will be absolutely requisite to place the patient in a darkened apartment, and employ the usual means of completely withdrawing the diseased organ from the influence of light.

My views as regards the regulation of the diet, and the adoption of the various other means generally employed for the subduction or relief of ocular inflammation, which have not been mentioned in the course of these remarks, will be explained at a future part of this series of observations.

On concluding my remarks on these various subjects, it is right to mention, that I shall have occasion to draw upon your memory when referring to them in connexion with the treatment of particular diseases—we shall not again speak of them at all in detail.

Mode of examining an inflamed eye.—I perceive I have at present said nothing respecting the mode of inspecting an inflamed eye for the purpose of ascertaining the particular nature and extent of the disease with which it may be affected, and as there are a few general remarks upon this subject which it may be desirable to mention, I shall proceed to their consideration before I engage in the investigation of the various inflammatory affections of the organ of vision. The mode of examining an inflamed eye will vary in accordance with the nature of the disease for which such examination is first instituted; but when the conjunctiva only is inflamed—simply inflamed,—you gently depress the lower lid, and observe, not only the appearance of the inferior part of the eye-ball, but also of the palpebral conjunctiva, and then, passing the thumb along the inferior tarsal margin, you elevate the upper lid so as to expose the superior part of the eye-ball, and, taking firm hold of a few of the eye-lashes, you raise the palpebra slightly from the globe, and investigate the state of its mucous surface. This must be done slowly, carefully, gently,—do not, as I have more than once witnessed, clumsily press a ponderous hand upon the eye-ball, or raise the upper-lid when its muscles are strongly contracting to oppose your efforts, with a sort of Herculean grasp, but gradually lift it upwards by placing the thumb, or index and middle fingers, upon its precise margin. I had an operation for extraction some time age, in a person named Butler, and in the course of nine days afterwards the eye was so very perfect in appearance, that I believe few of you, unless your attention had been expressly directed to the circumstance, would have judged that any operation whatever had been performed upon the eye, so nicely had the corneal section healed. I showed this case to a surgeon residing in the country, who happened to call upon me, but he handled

the eye so roughly, that the poor woman begged him to desist, and I also besought him to desist. Although this woman's eye was scarcely at all inflamed when this surgeon examined it, his uncouth handling induced very severe ophthalmia.

If there be present acute inflammation of the deep-seated textures you had better not examine the eye very frequently, and particularly by a bright light, for, such examinations will greatly aggravate the complaint. It is requisite to inspect the diseased organ now and then, for the purpose of witnessing the effect of treatment upon it, but such examinations should be carefully conducted—not made more frequently than is necessary for this purpose, and the eye should not be exposed to the light longer than is absolutely required. If you neglect this caution, I can tell you that your patients will be apt to complain of great aggravation of their suffering after the eye has been so handled and exposed. I do not wish to advocate scanty and imperfect examination, but it is my duty to inform you that, having once carefully inspected the eyes and determined the character and extent of the inflammation, at your first visit, you must not afterwards prolong the scrutiny to the same extent. Of course it is important to decide upon the nature and extent of the disease—to discover whether it be merely a slight external malady of one texture, requiring simple remedies, or a complicated deep-seated acute one, demanding active treatment. This, I say, it is most important to ascertain, and as a great majority of the diseases of the eye are of the former character, it is by no means difficult to cure them; and in conducting the business of a large eye institution where many patients are in attendance, you will be at first astonished to observe the rapidity with which many of the cases are dismissed, how soon they get well, and how uniform is the plan of

treatment they require. But, of course, these remarks only apply to the more simple and slight cases, which, although exhibiting an alarming appearance to the ignorant and uninitiated, it is by no means difficult to cure, with a dose or two of aperient medicine and the use of some simple cooling lotion. Hence it is that I often acquire greater credit for quickly curing an inflamed conjunctiva, which is evinced to the patient and his alarmed friends by a *blood-shot* appearance of the eye, than by detecting and curing a case of incipient retinitis, which may not be indicated by such outward and apparently severe symptoms, but which, if undiscovered or inactively treated, would almost certainly insure positive and permanent blindness. Thus, then, when it has been accurately determined that the case requires either simple or active treatment, the details of such treatment sink into comparative unimportance.

SECTION III.—CATARRHAL OPHTHALMIA.

Syn. *Catarrhal Inflammation of the Conjunctiva.—Ophthalmia Catarrhalis.—Conjunctivitis Catarrhalis.*

Having thus concluded the treatment of simple acute inflammation of the conjunctiva, and discussed, in a general manner, the merits of the major part of those remedial agents which are most commonly employed for the subduction of inflammation of the various textures of the eye, I proceed to the consideration of catarrhal ophthalmia—catarrhal inflammation of the conjunctiva.

You were told that the mucous membrane of the eye was subject to those maladies to which the same description of texture in other situations was liable, and among

other affections, to an inflammation producing an increase of its natural secretion, and arising generally from a peculiar condition of the atmosphere. You will often find a disease of this kind very prevalent, and it will be frequently accompanied by other catarrhal symptoms. This state of the mucous membrane of the eye is ascertained to be dependent, in many instances, on a peculiar condition of the atmosphere. It will not, however, be expected that I should, on this occasion, enter upon the investigation of that process by means of which the application of cold to the surface, or the occurrence of an altered state of atmosphere, give rise to the products to which we have just alluded, for, it is a subject involved in great obscurity, and would require for its proper elucidation, much inquiry and extensive research upon a point only collaterally connected with our subject; we will, therefore, be content to take the effects as they are presented to our notice, without attempting to explain that series and succession of events, by which the phenomena designated *catarrh*, are connected, as results with those external agents, which, we are well aware, give rise to their establishment.

Symptoms.—The earliest symptoms of catarrhal inflammation of the conjunctiva are, an uneasy sensation of smarting; a trivial degree of pain; augmented lachrymal secretion; and a slight increase of vascularity, which is least considerable near the cornea. The second set of symptoms are, considerable smarting, and a sensation of stiffness on moving the lids; redness of the sclerotic conjunctiva; greatly increased mucous secretion; and a slight amount of serous effusion beneath the conjunctiva, which is particularly evident immediately around the margin of the cornea, and also whenever the globe of the eye is moved in the orbit. The third set of symptoms consist of those in which the more important textures of

the eye have become affected, either from contiguity or sympathy.

If you see a patient with catarrhal ophthalmia at its commencement, you will observe that the redness is not very considerable, there will be great enlargement of those vessels which are situated towards the periphery of the globe, but that part of the conjunctiva near to the cornea will be almost as pale as usual;—there will not be that arrangement of pink vessels around the cornea which is so distinctly witnessed when the iris or ciliary processes are inflamed. The conjunctival vessels at first proceed in fasciculi, by degrees they become much enlarged, others increase in size, they approach nearer to the cornea, until, in severe cases, the whole of what is popularly termed the white of the eye, becomes one uniformly scarlet surface. You will remember that the vessels of the conjunctiva are of a scarlet colour, very different from the pink appearance noticed when those of the sclerotica are enlarged; it will also be remembered that they are loose, and may be readily moved about by the finger, or by suddenly altering the position of the conjunctiva with respect to the sclerotica.

You will not in these cases have much chemosis, but there may be, and there is indeed, very often, a slight degree of serous effusion beneath the conjunctiva, separating it, to a certain extent, from the sclerotica, and slightly raising it around and above the margin of the cornea; but it will rarely proceed beyond this, certainly not to the extent of producing that condition of chemosis you will notice in purulent and gonorrhœal ophthalmia.

The enlargement of the superficial vessels, by destroying the smoothness of those surfaces which so frequently and rapidly move upon each other, occasions considerable smarting and gives rise to a sensation such as would be

experienced if sand or dust were beneath the lids; but, independently of this sensation, there will be scarcely any pain, none of that aching and throbbing, or acute and darting pain, which characterize inflammation of the deep-seated parts; unless indeed, the inflammation shall have extended, as, in what we termed the third set of symptoms —then, of course, the symptoms of ophthalmitis may be present; but such a state of disease is not what we are now considering, and is one which will seldom, if ever, occur, if proper remedies be administered in due time.

Your patient will have, at first, increased lachrymal discharge, but, by degrees, this secretion of tears is diminished and the mucous secretion becomes gradually increased, so that, when the disease is fully developed, the frequent removal of this augmented quantity of mucus is rendered necessary. During sleep it incrusts at the edge of the tarsus, and accumulates in considerable quantity at the inner canthus, so as to prevent the patient from opening the lids when he first awakes, without giving rise to pain, and tearing away some of the ciliæ which are imbedded in the adhesive mucus which collects at the tarsal margins; very frequently strings or patches of this discharge will collect upon the cornea, rendering the patient's vision very defective, and they will often express considerable alarm lest their eye-sight should be lost—you need have no hesitation in allaying their apprehensions when so excited.

As this mucous discharge decides the catarrhal nature of the disease and furnishes one of the most striking characters by which it is distinguished, it is important that you should be well acquainted with its qualities in the different stages of the inflammation;—it will be, at first, of a thin consistence and of a grayish colour, by degrees it becomes more consistent, and is eventually thick and

glutinous, so as to *resemble* pus in its external qualities. These are the characters by which it is ultimately distinguished, and you will bear in mind that its primary qualities, as to colour, consistence and adhesiveness, will materially assist your judgment when deciding upon the nature of the disease.

You will discover that the palpebral portion of the conjunctiva will, in many instances, have participated in the mischief, and that a part of the secretion, which incrusts upon the border of the tarsus, and agglutinates the edges of the eye-lids, proceeds from it, and you will also find that the meibomian secretion becomes altered, and that, in short, a slight degree of tinea is present; indeed the palpebral conjunctiva may be primarily affected, and the sclerotic portion of that membrane may or may not be involved; the symptoms will be, in many respects, the same, except that the vascularity and tumefaction of the lining membrane of the lids will exist instead of the phenomena we noticed when describing the circumstances which characterized an affection of the sclerotic portion of the conjunctiva; there will also be a greater degree of irritation at the tarsal borders, owing to the inflammation of the meibomian glands, and a consequent change in the qualities of their secretion.

It will often happen that the redness of the conjunctiva is not equally and uniformly great, sometimes small effusions of blood will exist in the subconjunctival cellular membrane, and will communicate to the anterior aspect of the eye-ball a spotted or mottled appearance.

The palpebræ will often be puffed, slightly swollen and œdematous, so that the patient will say that they feel uncomfortable, and stiff and heavy, and that he cannot easily open them for an hour or two after he has risen in a morning.

Constitutional Symptoms.—There will generally exist a degree of constitutional disturbance corresponding to the severity of the inflammation of the eye, and, if the mucous membrane of the nose become much and extensively affected, there will be a sensation of weight over the forehead; a certain amount of catarrhal fever attended with occasional rigors; slight cough; increased discharge from the schneiderian membrane; and so on—in short there will exist the symptoms of decided catarrh. Sometimes the uneasiness occasioned by catarrhal ophthalmia, is increased during the day, and much relieved during the night, or if that be not the case, there will be a distinct remission and exacerbation of the symptoms at regular intervals.

Causes.—It has been mentioned that a peculiar state of the atmosphere is the most frequent cause of the disease under consideration, and that the mucous tunic of the eye is liable to be diseased from many of those agents which exert an injurious influence upon mucous membranes in general; and to this statement it remains to be added, that keen winds or currents of cold air, applied directly to the surface of the eye will also produce catarrhal ophthalmia, under circumstances which render it highly improbable that there exists that particular state of atmosphere, which, in the common acceptation of the term, is favourable to the production of influenza, or to catarrhal affections generally; long exposure of the body to cold without a degree of exercise sufficient to prevent chilliness; or subjecting the surface of the body generally, or, of the head or face particularly, to the influence of rain or snow, or allowing the body to become suddenly chilled by inaction or other causes, after its temperature has been raised by exercise, or increased by sitting in a warm room, or by remaining in a protected situation; sudden and extreme changes in the state of the atmosphere as to heat or cold,

dryness or dampness, are also to be classed among the causes of catarrhal ophthalmia. From this account of the causes of this malady, you would naturally expect that at certain seasons, and in particular districts, it would be exceedingly prevalent, and such is really the case; you will find that at a public eye infirmary, for instance, the children of the poor residing in some particular district, will be affected in great numbers, and the same occurrence is sometimes noticed in large schools.

Diagnosis.—You would distinguish catarrhal ophthalmia from inflammation of the deep-seated textures, by the absence of acute pain, and much intolerance of light; by the colour, the situation, and the mobility of the blood vessels; by the state of the pupil; and by the condition of vision; and you would distinguish the catarrhal from other forms of conjunctival inflammation, by the nature of its exciting cause; by the quality and quantity of the discharge; the general appearance of the inflamed organ; and (if such were the case as very generally happens) by the presence of other catarrhal symptoms, or the prevalence of catarrhal affections generally. It is not likely to be confounded with gonorrhœal ophthalmia, on account of the mildness of the symptoms of the disease under consideration, compared with those of gonorrhœal ophthalmia; the difference in the qualities of the secretion; and the absence of severe chemosis, and extreme tumefaction of the eye-lids. It is however more difficult to lay down certain rules by which catarrhal may be distinguished from purulent ophthalmia in the adult, especially when this latter affection is very mild;—purulent ophthalmia is attended with a discharge of a yellow colour, and of a distinct purulent nature; the meibomian glands are not materially affected; it is capable of being propagated by contagion; it is not attended with an affection of the other mucous membranes;

and it does not appear that atmospheric influence *alone* is capable of producing it, at least, if it be so, it is only in a few very rare instances;—catarrhal ophthalmia is, on the contrary, attended with a discharge of a grayish colour, and a mucous quality: it is accompanied with great irritation of the tarsal margins; it is not propagated by contagion; it is generally connected with an affection of other mucous structures, and in many instances is much controlled by atmospheric influence. If you will carefully bear in mind these circumstances and contrast them with those I have pointed out as belonging to other diseases of the conjunctiva I do not think you will often be mistaken in your diagnosis of catarrhal ophthalmia.

Prognosis.—Catarrhal inflammation of the conjunctiva generally follows a determinate course, and even when left to itself will usually subside without leaving behind any material defect. But if improperly managed it is liable to induce tinea, to impair the equality of the palpebral conjunctiva, and it may also extend and give rise to effects seriously detrimental to vision.

From a perusal of its history and an acquaintance with its nature and the general mildness of its symptoms, we are prepared to pronounce a favourable opinion in reference to the result of every case, the management of which we may be called upon to undertake—that is presuming we see such case before the extension of the disease and consequently before any of those irremediable effects of ophthalmic inflammation which sometimes occur, have taken place.

Treatment.—It will not be necessary to enter upon the consideration of the treatment adapted to that stage of the disease (if indeed it can properly be termed, a stage of catarrhal ophthalmia) when, either from the omission of remedies, or the misapplication of them, it may have ex-

tended to other textures, and involved the deep-seated and more important structures of the eye, inasmuch as I have already spoken at some length on that subject when treating of simple acute inflammation of the conjunctiva, and besides, such a state of things is of very unusual occurence;—my observations therefore will be directed to the management of those two conditions termed, the first and second set of symptoms.

The severity of the symptoms would determine the propriety of general bleeding, and also regulate the amount of blood you might deem it advisable to abstract; you might bleed in the arm, or take blood by cupping either from the temples or the back of the neck, as you might judge best suited to the circumstances of the case; or the symptoms may be so exceedingly slight, and the patient so weak and delicate, that you might think it more prudent to apply merely a few leeches, or indeed not to take away any blood either by general or local means. You will generally afford great relief by the abstraction of blood, and frequently remove the inflammation in a few days, by so commencing your treatmemt. It is right of course to keep the bowels perfectly open, and for this purpose you may select from among the numerous kinds of purgatives such as appear to be most suitable to the various circumstances of your patient; the weak delicate subject of a relaxed habit would probably be injured and needlessly enfeebled by an amount of purgative medicine which would be inadequate to produce the slightest action on the bowels of the hardy and robust. It would also be advisable to administer at bed time, a few grains of calomel with ten or fifteen of Dover's powder, and to direct the careful use of a pediluvium, more especially if other catarrhal symptoms be present. To prevent the agglutination of the tarsal margins, and to correct the altered state of the meibomian

secretion, you might order the unguentum plumbi* to be smeared along the edges of the eye-lids, two or three times a day, first removing the discharge which is apt to collect in that situation by bathing the part with warm milk and water; you would be careful to direct this ointment to be applied at bed time, as its application will greatly contribute to your patients comfort, and prevent that adhesion of the lids which is not only injurious but very painful. After this ointment has been used two or three days, you may direct the employment of one or other of the following unguents:—

1. ℞. Ung. hyd. nit. ʒj.; ung. cetacei ʒii. misce.

2. ℞. Hyd. nitrico-oxydi. gr. ij.; ung. cetacei ʒj. misce accuratissime.

A small quantity of one or other of these ointments may be dissolved and carefully smeared along the precise margin of the eye-lids every night at bed time. I might here very conveniently give you a long list of applications, which, operating pretty much in a like manner and on a similar principle have, at various periods, obtained considerable celebrity, but I shall be satisfied on the present occasion with merely mentioning to you those remedies of this class which have been most frequently used with the greatest measure of advantage in my own practice.

* This ointment may be conveniently prepared, by carefully rubbing half a drachm of the liq. plumbi acetatis, into an ounce of well made spermaceti ointment. It is of great consequence however that the ointment I have just mentioned and indeed all unguents which are applied to the eye, should be most carefully and accurately prepared. I have seen the red precipitate ointment so carelessly made, that the small undivided granules of the preparation have been distinctly visible, and by their lodgment on the tarsal margin or the conjuctiva have given rise to much unnecessary pain, aggravated the inflammation, and even produced ulceration. When powders enter into the composition of ointments, which are intended to be applied to the eye or to the margin of the palpebræ, it is of course most important that they should be first reduced to a fine, or, as it is phrased, an impalpable powder.

Your collyria will consist of some astringent fluid; a weak solution of alum or zinc will generally answer the purpose of relieving pain, and diminishing the discharge; they may be applied either in a warm or cold state, as may be most soothing to your patient's feelings—prejudice would direct you never to apply them, under such circumstances, when cold, but experience will give you very different instruction; but I have previously pointed out the circumstances which would regulate your practice in this particular. It may be advisable to use anodyne fomentations, such as a weak aqueous solution of opium, or a decoction of poppies; an extremely painful condition of the eye, or an unusual irritability of constitution, would render such local applications desirable. I have sometimes directed the use of herb fomentations with great advantage, but, speaking generally, I do not recommend them to your notice, for they are apt, and particularly when used for a long time, to relax the conjunctiva, to promote the effusion of serum within the subconjunctival cellular membrane, and to lessen the disposition to contraction on the part of the enlarged and distended blood-vessels. If you have occasion to use a fomentation of this description, you may direct the patient to have a quantity of boiling water poured over a few camomile blows contained in a fine flannel bag, and to apply this to the eye two or three times during the day for about ten minutes, as soon as it is cool enough for the purpose.

It may be mentioned, that if the disease be so little severe that you do not think the removal of blood necessary; or, if venesection has been practised, and the inflammation be only slightly diminished, it would be right to apply a blister to the nape of the neck, or to adopt some other mode of exciting counter-irritation.

As great *intolerantia lucis* is not one of the usual symp-

toms of this disease, you would not judge it necessary to exclude light from the eye altogether, but merely direct the patient to wear a green shade, and thus protect the inflamed organ from the vivid impression of its more brilliant rays; certainly no mode of protecting the eyes from light beyond this can, in ordinary cases, be required.

Of course it will be requisite to limit the diet of the patient, in a great measure, to warm diluting beverages; no animal food or strong liquors should be allowed until the symptoms are declining, and you will find it prudent, if you desire to prevent a return of the disease, to be imperative in your request, and not to allow the full diet to be resumed too soon.

It is well known that medical men differ greatly, not only in their views of disease, but also as to their modes of treatment; and I shall illustrate this fact by referring to one or two sentences from that part of Dr. VETCH's observations on diseases of the eye, which relates to the treatment, and indeed includes nearly the whole of his remarks on the treatment of catarrhal ophthalmia. *"It is a well-known fact," (says he) "that the application of a powerful stimulant to a part in which inflammation has taken place, will, by carrying the excitement of the vessels beyond the action of the disease, put a stop to the further progress of inflammation. On this principle this form of ophthalmia yields, for the most part, to any strong stimulus applied to the part, such as spirits or vinegar; snuff blown into the eye has the same effect of curing this inflammation, by exciting a greater, though a temporary distention of the vessels." If you for a moment reflect on the nature of the remedies here recommended, and, at the same time, consider that their use comprehends nearly the whole of the

* *A Practical Treatise on Diseases of the Eye*, by J. VETCH, p. 171.

treatment advised for the cure of an acute inflammation of the eye, you will agree with me that it is not more meagre and inappropriate in means, than unscientific in their application. The *unguentum nigrum* has recently become a favourite application, (particularly with Mr. GUTHRIE*) for the removal of this and many other forms of inflammation of the conjunctiva, attended with increased discharge from its surface; but I cannot recommend its use for the cure of catarrhal ophthalmia. I shall have occasion to point out in the course of these observations, many diseases, at a certain stage of which it may be advantageously applied.

The treatment of catarrhal ophthalmia by means of strong astringent and stimulating applications, used at the commencement of the disease, has many advocates, and, among others, it is especially recommended, as the result of much practice and great experience, by Mr. MELIN (*London Med. and Physical Journal*, vol. liii.) and Mr. GUTHRIE.

Catarrhal ophthalmia, when mismanaged or neglected, is liable to leave behind a diseased state of the tarsal margins and of the meibomian glands, ducts and follicles, and these conditions of disease are sometimes pretty fully discussed by writers on catarrhal ophthalmia, as though they constituted an essential and necessary part, or sequence of, the disease. But it will be understood that the morbid state of the palpebral conjunctiva, of the tarsal margins, &c., consequent on this malady, when it has been incorrectly treated or neglected, are common to many forms of acute conjunctivitis when similarly mismanaged.

Writers on the diseases of the eye describe an affection of the conjunctiva and of the sclerotica under the name of

* *Medico-Chirurgical Review*, for July, 1832.

catarrho-rheumatic ophthalmia, in which, in addition to the symptoms which we shall subsequently point out as proper to rheumatic sclerotitis, there are present, the majority of those which belong to catarrhal inflammation of the conjunctiva. However, although I am aware, and have previously stated, that the proximity of the separate textures of the eye to each other promotes the extension of morbid action when it exists in any one of them, yet I do not consider it advisable to change the name of disease on account of this occasional combination of morbid affection. Catarrhal inflammation of the conjunctiva may induce an inflammation of the sclerotica, and rheumatic sclerotitis may originate inflammation of the conjunctiva, attended with an increased secretion from its surface. Pathological precision requires that we should advert to this circumstance, but it is scarcely necessary to allude to the confusion which would take place, if we were to describe in detail, as separate diseases, the morbid affection these numerous and varied conditions would involve. Hence then, I have preferred to describe, as distinct maladies, the diseased conditions of particular textures, alluding to the fact of their occasional extension, and pointing out the relative frequency with which such extension of disease takes place, in reference to other and proximate parts.

SECTION IV.—PURULENT OPHTHALMIA IN THE ADULT.

Syn. *Purulent Inflammation of the Conjunctiva.—Suppurative Inflammation of the Conjunctiva.—Egyptian Ophthalmia.—Ophthalmia puriformis.—Ophthalmia contagiosa.—Ophthalmo-blenorrhœa.*

Purulent ophthalmia, or inflammation of the conjunctiva producing a purulent discharge, has received a great variety of names. Mr. Ware termed this disease the *oculus purulentus;* Professor Schmidt has named it *ophthalmo-blenorrhœa;* and when it prevailed extensively among the troops in Egypt, it was called the *Egyptian ophthalmia.* It will, I think, be admitted that the term *purulent inflammation of the conjunctiva*, while it points out the variety, the product, and also the seat of the inflammation, is sufficiently comprehensive and intelligible. You will find that this disease occurs very frequently in newly-born infants, and that it will, for a variety of reasons, be conveniently considered as it takes place in the adult and in the infant—we proceed then to consider the *purulent ophthalmia of adults.*

The severe character of this inflammation may be estimated from various accounts of its effects, as represented by many excellent surgeons who had the charge of the affected troops during its terrific prevalence about thirty years ago; and also from the statement of those who had an opportunity of witnessing its injurious influence in schools, and various other situations, in which it existed in a severe form and to a great extent. The following extracts comprise a few of the more interesting of these statements:—"The total strength of the second battalion of the 52nd, from which this description of the disease has

been taken, was somewhat about seven hundred men. Six hundred and thirty-six cases of ophthalmia, including relapses, were admitted into the hospital from August, 1805, when the disease commenced, till the same month in 1806; of these, fifty were dismissed with the loss of both eyes, and forty with that of one. It did not appear to be decidedly more violent in any one of the slighter shades of temperament than another, and either eye seemed equally liable to experience the violence of the disease." (VETCH, p. 69.)

"It is a melancholy fact, as appears by the returns of Chelsea and Kilmainham hospitals, that 2317 soldiers were, on the first of December, 1810, a burden upon the public, from blindness, in consequence of ophthalmia. Those soldiers, who have lost the sight of one eye, are not included in the number above stated, as they are sent from their respective regiments to garrison duty, and are not registered as ophthalmic pensioners, at either of the royal hospitals above mentioned."

"The contagious ophthalmia has crippled many of our best regular regiments to such a degree, as, for a time, to render them unfit for service; and though the regiments which were in Egypt have, in general, suffered most from the disease, yet it has prevailed extensively in others which have never served in that country. Before it made its appearance in this country, it prevailed very much amongst the regiments which were stationed in Sicily, Malta, and Gibraltar; and it has also accompanied the British troops to almost every foreign station to which they have been sent." (MACGREGOR *in Transactions*, &c. p. 51.)

Of 1604 cases of acute purulent ophthalmia treated by MUELLER, in the Prussian garrison of Mentz, only 1344 were restored to the service perfectly well, as respects the state of their vision.

"The French slave-ship Rôdeur, Captain B——, of 200 tons burden, left Hâvre on the 24th of January, 1819, for the coast of Africa, reached her destination on the 14th of March, and cast anchor off Bonny. The crew of 22 men enjoyed good health the whole voyage, and during their stay at Bonny, till the 6th of April. No trace of ophthalmia had been observed among the inhabitants of the coast, and it was not until fifteen days after the Rôdeur had put to sea, and was nearly on the equator, that the first symptoms of this frightful disease were perceived.

"It was observed that the negroes, who were 160 in number, and crowded together in the hold, and between decks, had contracted a considerable redness of the eyes, which spread with rapidity from one to another. At first, however, the crew paid no great attention to this appearance, imagining that it was occasioned merely by want of fresh air in the hold, and by the scarcity of water; for they already limited the allowance of water to eight ounces a day, and some time after they could allow only half a glass a day. It was thought sufficient to make use of an eye-water made from an infusion of elder flowers, and following the advice of the person who acted as ship surgeon, to bring up the negroes in turns upon deck. This salutary measure, however, they were obliged to abandon; for the poor Africans, torn from their native home, and heart-wrung by the horrors of their situation, as well as by the recollections of their lost freedom, embracing each other, threw themselves into the sea.

"The disease which had spread amongst the negroes in a frightful and rapid manner, now began to threaten even the crew. The first man of the crew attacked was a sailor, who slept under deck, close to the grated partition which communicated with the hold. Next day a lad was affected

with the ophthalmia; and, in the course of the next three days, the captain, and almost all the crew, were seized.

"In the morning, on awakening, the patients experienced a slight pricking and itching in the edges of the eye-lids, which became red and swoln. Next day, the swelling of the eye-lids was increased, and attended with sharp pain; in order to lessen which, they applied to the eyes poultices of rice, as hot as they could bear them. On the third day of the disease a discharge of yellowish matter took place, rather thin at first, but which afterwards became viscid and greenish, and was so abundant, that the patients had only to open their eyes every quarter of an hour, when the matter fell in drops. From the commencement of the disease there were considerable intolerance of light and discharge of tears. When the rice failed, boiled vermicelli was used for poultices. On the fifth day blisters were applied to the nape of the neck of some of the patients; but, as the cantharides were soon exhausted, they endeavoured to supply their place by the use of pediluvia containing mustard, and by exposing the swoln eye-lids to the steam of hot water.

"Far from diminishing under this treatment, the pain increased from day to day, as well as the number of those who lost their sight; so that the crew, besides fearing a revolt among the negroes, were struck were terror lest they should not be able to manage the vessel till they should reach the Caribbee Islands. One sailor only had escaped the contagion, and upon him their whole hopes depended. The Rôdeur had already fallen in with a Spanish ship, the Leon, whose whole crew were so affected with the same disease, that they could no longer manage their ship, but begged the aid of the Rôdeur, already almost as helpless as themselves. The seamen of the Rôdeur, however, could not abandon their own ship,

on account of the negroes; nor had they room to receive the crew of the Leon. The difficulty of nursing so many patients in so narrow a space, and the want of fresh provisions and of medicines, made the survivors envious of those who died; a fate which seemed to be fast coming upon all, and the thought of which caused general consternation.

"Some of the sailors made use of brandy, which they dropped between their eye-lids, and from which they experienced some relief; which might have suggested to the surgeon the propriety of a local stimulating treatment.

"On the twelfth day, the sailors who had experienced some relief came upon deck to relieve the others. Some were thrice attacked with the disease.

"The tumefaction of the eye-lids having subsided, some phlyctenulæ were observed on the conjunctiva of the eye-ball. These the surgeon had the imprudence to open; a step which proved hurtful in his own case, for he remained blind, without any possibility of recovering his sight.

"On reaching Guadaloupe, on the 21st of June, the crew was in a deplorable state; but, very soon after, from the use of fresh provisions, and by simple lotions of spring water and lemon juice, recommended by a negress, they became sensibly better. Three days after coming ashore, the only man who, during the voyage, had escaped the contagion, was in his turn seized with the same symptoms; the ophthalmia running its course as it had done on board ship.

"Of the negroes, thirty-nine remained totally blind, twelve lost each one eye, and fourteen had specks, more or less considerable, of the cornea.

"Of the crew, twelve men lost their sight; one of these was the surgeon. Five lost each one eye, and amongst these was the captain. Four had considerable specks,

and adhesions of the iris to the cornea." (*Bibliothèque Ophthalmologique*, par M. Guillié, p. 74.)

The disease is, however, by no means so frightful and severe in children as in adult patients. I scarcely remember to have lost an eye affected with acute purulent (not gonorrhœal) ophthalmia occurring in children, when I have had an opportunity of witnessing the disease prior to the occurrence of some of the more serious effects of such inflammation. Mr. Macgregor remarks in his paper, published in the *Transactions of a Society for the Promotion of Medical and Chirurgical Knowledge*, "the ophthalmia, which has prevailed for some years at the Military Asylum, appears to be of the same nature with that which has raged with such violence in the army, since its first introduction into this country, by the soldiers who returned from Egypt in the years 1800, 1801, and 1802. Its consequences have not been so injurious to children as to adults; for, out of the great number of children that have been afflicted with the disease at the Military Asylum, only six have lost the sight of both eyes, and twelve the sight of one eye." (P. 49.)

Symptoms.—The symptoms which indicate the commencement of this disease, are, a slight tingling and stiffness of the lids, and an itching or smarting sensation at the corners of the eye; persons in this state will tell you that the eye feels hot and dry, and that the movements of the lids upon its surface occasion some uneasiness; this sensation of uneasiness will very soon be superseded by severe burning pain, and they will complain as if sand or particles of dust were beneath the palpebræ; at the same time there will be a slight increase of vascularity, and a profuse flow of scalding tears, with some intolerance of light; the eye-lids will be swoln, and their margins will be red and irritable—the mucous surface of the inferior palpe-

bra will generally be found in a highly injected state. The preceding set of symptoms is quickly succeeded by the following:—the pain is now of a severe and throbbing character, and is not always limited to the eye, but sometimes extends to the head and face, producing, if one eye only is inflamed, intense hemicrania and facial neuralgia; there is a sense of tension of the globe; the conjunctiva presents an almost uniformly red surface, and is raised, in various degrees in different instances, around the cornea; the eyelids are tumid, and their edges, and still more their angles, are extremely red and irritable; the patient cannot bear the smallest quantity of light; there is an abundant secretion of purulent fluid, which requires to be frequently removed, or, if allowed to remain, and the lids are closed, it collects beneath and painfully distends them. This fluid is, at the commencement of the inflammation, very thin and of a pale yellow colour, its colour quickly becomes deeper, and its consistence increased, until it is a thick straw-coloured fluid; and finally, this secretion becomes blended with serous, sanious, or sanguineous fluids. You will generally find the degree of inflammation indicated by the colour and density of the discharge; it will be pale and thin if the inflammation be slight, and more consistent and of a deep yellow colour if it be severe; you would be apprehensive of serious mischief (independently of an examination of the inflamed eye) as soon as the discharge became blended with the thin fluids just mentioned.

If the inflammation be not now checked, it will spread to more important textures, and will be indicated by the symptoms peculiar to its extent and complication; the cornea also will participate in the mischief, its brilliancy will be destroyed, and it will assume a pale dingy-ash colour, and will eventually slough or burst, and permit the escape of the contents of the globe, when the pain and

other severe symptoms will usually subside. Or, it may happen that the membrane of the aqueous humor may remain entire, projecting as a pellucid tumour through the corneal aperture, and preventing the transit of the humors; or the lens may be prevented from escaping by the small size of the opening in the cornea, and thus may give rise to a deceptive expectation on the part of the patient as to the preservation of his sight; for, on the destruction and separation of a portion of the opaque cornea, the light will pass through the humors, the transparency of which has not been materially injured, and for a short time vision may be tolerably distinct; but this state will be of very brief duration, for, sooner or later, the humors must be discharged, if the opening in the cornea be considerable, or, if not, the discharge of the aqueous humor and consequent prolapse of the iris, combined with the opaque and ulcerated state of the cornea around the opening and very probably closure of the pupil, will altogether prevent, or materially interfere with, vision. Such a patient may, indeed, recover a certain degree of sight, but it will be only sufficient to interfere with the vision of the opposite organ; it were better that collapse of the eye-ball be permitted to occur, so that an artificial eye may be worn; the deformity will be then diminished, and the obscurity of vision occasioned by possessing two eyes of very different degrees of visual perfection, prevented. If, however, the ulcer of the cornea be small, or, if extensive, superficial, it may, in the one case, be filled up by lymphatic deposition, and, in the other, replaced by an adventitious structure, and in both instances, there will exist an extensive opacity, which, in many cases, cannot be removed; the pupil may, however, be drawn by natural efforts quite away from the opaque part of the cornea, or, if not, there will probably be space enough for the formation of an artificial pupil.

It may happen that the palpebral portion of the conjunctiva may alone be affected at the commencement;* you will be apprised of this, by the great tumefaction of the lids, (which are in many instances so much thickened and swoln, as to protrude externally, giving rise to the most painful form of ectropium), the extreme vascularity of their mucous surface, and the absence of much redness of the eye-ball, and intolerance of light.

It is not necessary for me to detain you long by stating the kind and degree of constitutional symptoms you would meet with in such cases; they would vary with the peculiarities of your patient, the stage of the disease, and the severity of the local affection. Of course you would not expect a patient to be suffering from those occurrences immediately preliminary to sloughing of the cornea and suppuration of the eye-ball, without also experiencing considerable constitutional disturbance; there would be in such a case, irritative fever and general derangement of the health; and you would bear this in mind in determining your means of cure.

There is a mild form of this disease sometimes very prevalent among children, producing no important symptoms and requiring no active treatment; it would appear to be readily disseminated by the contact of matter from the eye of one child to that of another, aided by disordered health, a damp state of atmosphere, and want of cleanliness and good nursing; for, if you will direct their parents not to allow the linen or sponge with which the

* "The disease evidently began, and terminated, in the eye-lids, and the surface of the eye-ball seemed only to be affected from its proximity; for they were often in a diseased state for weeks, nay even for months, after every symptom of the disease in the membranes covering the eye-ball, had completely disappeared." (An account of an Ophthalmia which prevailed in the Royal Military Asylum in 1804. By P. Macgregor, Esq. *Transactions* &c., p. 41.)

diseased eye is bathed, to be used for any other purpose, and enjoin the strictest cleanliness, and attend to the state of the bowels, you will generally banish it from the neighbourhood in which it prevails—generally speaking it does not attack those children who are well nursed, and whose constitutions are vigorous and robust.

Redness.—The first appearance of vascularity is noticed in the palpebral conjunctiva, and is evinced by the trivial enlargement of only a few of the blood-vessels in that situation. This vascularity rapidly increases and soon extends to the sclerotic conjunctiva, and at this period, if the eye be cleansed and carefully examined, the whole of the conjunctival surface will be found to be vividly and intensely red, the membrane will appear almost pulpy, slightly rough like the pile of fine velvet, its texture will not be evolved and expanded as though it were firmly stretched into a smooth and equal surface. Just at this stage the sclerotic vessels will begin to enlarge, a few considerable pink vessels may be distinctly perceived on a careful examination, and now the cornea will become cloudy, and the usual symptoms of disease of the internal tunics will be detected.

State of the subconjunctival cellular membrane.—Soon after the conjunctiva has become affected the inflammation extends to the cellular membrane beneath, serous infiltration first takes place, afterwards pus and lymph are secreted, and in this way the conjunctiva is raised, so as to protrude externally and give rise to ectropium; that part of the chemosis which surrounds the cornea is forced over its margin, so as to conceal the whole of that tunic and produce an appearance as though the entire anterior aspect of the eye-ball was one uniform and continued chemotic surface. The form of chemosis which is usually present in this severe variety of disease, is that which we formerly

designated the acute lymphatic or active inflammatory chemosis. The effects this subconjunctival inflammation will produce upon the cornea, upon its own texture, and also upon the conjunctival surface, will be presently explained.

Pain.—The pain arising from acute purulent ophthalmia is not confined to the eye, sometimes it is seated deep within the orbit, or extends round its margin ; sometimes it is very severe just about the supra and infra-orbitary foramina, or upon the cheek bone, and occasionally it affects the whole head, or if one eye is much worse than the other, the pain may be confined to the side of the head, and will consist of the most intolerable hemicrania. This pain in and around the eye is represented by those who have endured it in its severest forms, as an agony of the most horrid description. The sensation as though sand were beneath the lids arises, as I have formerly explained, in a great measure from the inequality produced by the enlargement of the vessels of the inflamed conjunctiva, and it is one of the earliest symptoms connected with the more acute examples of this malady, and where it comes on quickly, and increases rapidly, the case threatens to be unusally severe, and will require the most prompt and active treatment. The subsidence of this sensation on the abstraction of blood is very remarkable, and it is no bad guide to practice, to allow the extent and repetition of bleeding to be regulated by the removal and return of this unpleasant feeling. I have stated that the enlargement of the superficial vessels, their rapid, sudden, and considerable distention, communicates that sensation as of sand or gritty particles beneath the lids which is so generally complained of at the onset of acute purulent ophthalmia, but it must be remembered that when the same sensation exists in a more aggravated form at a later and further stage of the disease it is not always,

nor I believe generally, solely owing to this circumstance. The enlargement of the small mucous glands which are situated in the subconjunctival cellular membrane and between the mucous membrane and the tarsal cartilage, and the distention of their follicular apparatus, augment the inequality of the mucous surface and combine to render the painful sensation produced by this irregularity of surface much greater than it otherwise would be. These glands are most abundant in that part of the conjunctiva near the tarsal margin, and as they have, placed behind them, a hard and somewhat unyielding texture (the tarsal cartilage), they are necessarily projected forwards and are distinctly perceived to render the conjunctival surface very unequal. Such, I am led to conclude, was the opinion of Mr. Macgregor, for after relating the symptoms of various cases of acute purulent ophthalmia, he says, "when the inner surface of the eye-lids was examined with a magnifying glass, the small sebaceous glands situated there were found increased in size, and of a redder colour than natural." (*Transactions of a Society &c.* vol. iii. p. 38.)

Tension of the eye-ball.—Very soon after the pain has commenced, and especially if no active depletive measures be adopted, there will be a tense and painful state of the eye-ball. It will feel as though its fluid contents were augmented, and also as though it were too large for its socket, and patients will complain most dreadfully of the agony produced by this tense and compressed condition of the globe. The reason of all this is sufficiently manifest. The inflammation of the conjunctiva very rapidly extends to the deeper seated parts, their secretion is increased, and the augmented fluid contents of the eye-ball communicate, by their pressure on the containing parts, that horrid sensation of tension of which patients so uniformly complain. The thickened state of the conjunctiva, the inflamed state

of the subconjunctival cellular membrane, and the condition of chemosis which are present, produce a great degree of compression upon the external tunics of the eye, so that these parts (the cornea and sclerotica) may be said to be placed between two compressive agents,—the contents of the eye-ball on the one hand, and the enlarged textures external to them, on the other. For the relief of this tense and compressed state of the globe, it has been suggested to scarify the tumid conjunctiva, and also to evacuate the aqueous humor, and we shall presently explain how far, and in what cases, these remedial measures may be employed with a prospect of advantage.

Intolerance of light.—The acute nature of this malady, and its tendency to spread and implicate other parts of the eye, are evinced by the early occurrence of *intolerantia lucis.* But it may be mentioned that decided aversion to light is merely exhibited in the most severe cases, and then only when the malady has began to affect some other texture in addition to that in which it commenced. The occurrence of intolerance of light or otherwise has induced some authors to divide this disease into two varieties, but there appears to be no reason why a circumstance of this nature, dependant as it is on the mere degree of inflammation which may be present, should render such a distinction necessary. I feel assured that the intolerance of light, when present to any great extent, does not depend on the mere sympathy of the retina with the inflamed conjunctiva, but that it is owing to a general excitement of the vascular system of the eye, and to a commencing participation in the inflammation, on the part of either the cornea, the sclerotica, or the membrane of the aqueous humor.

Lachrymation.—A profuse flow of scalding tears is a frequent attendant on the established form of acute purulent ophthalmia, and it has been suggested that the pres-

sure the lachrymal gland sustained by the enlargement of the contents of the orbit, may promote its secreting function, and in this way produce the lachrymation in question. Increased lachrymation attends many of the forms of acute ophthalmic inflammation, and tends no doubt to relieve the vascular plenitude or determination which exists under such circumstances throughout the whole vascular economy of the organ of vision. The flow of tears is not increased at the precise commencement of this disease, but takes place as soon as it becomes pretty fully developed, and increases with the advancement of the inflammatory malady.

Characters of the discharge.—The discharge first noticed consists of a thin and somewhat pale and tenacious matter, it soon becomes very abundant and acquires a greater degree of consistence, and is then a bright straw-coloured fluid. Its colour becomes gradually paler as the disease declines. The quantity of fluid sometimes secreted is very considerable. Dr. Vetch states that it amounted, in some cases under his care, to several ounces in twenty four hours. The degree and progress of the inflammation are well marked by the quantity, the colour, and other characters of the discharge.

Tumefaction of the eye-lids.—I have stated that the eye-lids are sometimes enormously enlarged. If we carefully watch the progress and the series of changes which occur in the textures of the palpebræ, it will be remarked that they are at first somewhat vascular towards their tarsal margin, and soon afterwards, with an increase of this vascularity, there is a perceptible enlargement or swelling of the part. They are then, at first, a little vascular and swoln at their tarsal margins, by degrees they become more and more enlarged, a number of vessels may be seen ramifying throughout their texture, their cutaneous surface becomes at first red, and afterwards dark-coloured

and nearly of a purple hue. In severe cases the circulation appears to be almost stagnant, at least the part is full of venous blood, the subcutaneous cellular membrane is distended with serous and other fluids, and the part hangs down upon the cheek, and appears as a large, purple coloured, convex mass, covering a great part of the side of the face. This state of things is exhibited in the engraving in the work of Dr. VETCH, and the representation is by no means an exaggerated one. When the disease has proceeded to this extent, when the eye-lid is so enlarged, discoloured, and prolonged, the eye-ball is generally in a state of suppuration, and it will very rarely indeed happen that any useful degree of vision is preserved. Connected with this state of disease are various alterations in the conjunctive membrane, some of which have been well represented by GRAEFE, EBLE, MUELLER, ADAMS, &c., and which we shall more particularly point out when we speak of the effects of purulent ophthalmia.

Condition of the surface of the conjunctiva.—I have explained that the vessels of the conjunctiva are enlarged, and that its mucous glands are augmented and their cryptæ distended. These circumstances are clearly and decidedly present as a part, and not as an effect, of the disease; but it is not to these circumstances alone that the morbid state of the conjunctiva, termed *granular*, which sometimes succeeds acute purulent ophthalmia, are owing, for it will be remembered, that many other circumstances combine to alter the character of the conjunctival surface, such as the effect of inflamation upon it, the organization of inflammatory matters which are attached to it, and especially, the condition of the sub-conjunctival cellular membrane which may be produced by the continuance of chemosis in its various forms and degrees.

State of the lachrymal caruncle, the semilunar mem-

brane, and the tarsal margins.—The lachrymal caruncle and semilunar membrane are generally enlarged and very vascular, but the extent to which this increase of size and vascularity may proceed, vary in different instances. Sometimes the lachrymal caruncle will be enormously swollen, its surface will be granular and unequal like that of a mulberry, and its colour will be a deep red, bordering on purple. The semilunar membrane will, in a few instances, extend over a great part of the surface of the eye as a liver-coloured sarcomatous mass, which will bleed very freely on the slightest incision or division of its substance. The tarsal margins are generally swoln and red; they are thickened by participation in the inflammation and by the enlargement of the meibomian glands and follicles. The puncta lachrymalia are for the most part closed, the margin of the orifice is red and tumid, and, owing to its tumefaction, the puncta are incapable of transmitting the tears into the lachrymal conduits.

Having given a rapid history of the progress of the disease, and subsequently examined its more important phenomena somewhat in detail, I proceed to speak of the—

Effects of purulent ophthalmia.—The effects produced by the purulent ophthalmia of adults will be chiefly determined by the severity of the inflammation, the time at which it first engages medical attention, and the mode in which it is treated. If your treatment be judicious, and the disease have only just commenced, you would expect to remove it entirely, without leaving behind any functional or structural mischief; but if, on the contrary, you were not called to such a case until the disease had advanced to the production of ophthalmitis, attended by active inflammatory chemosis, you would not, in many instances, be able to prevent some of its worst consequences, namely, sloughing of the cornea, and suppuration and collapse of the eye-ball.

1. *Diseased condition of the conjunctiva.*—The continuance of chemosis may cause ulceration of those points of the chemotic surface which are most prominent and the subsequent union of the ulcerated parts, and hence partial adhesion of the eye-lid to the eye-ball; or, as the chemosis subsides, the matters which distended the subconjunctival cellular membrane may be irregularly absorbed, and the surface of the conjunctive membrane may be consequently rendered more or less uneven. Deposition upon the inflamed conjunctiva may take place and acquire organization. The conjunctive surface may be rendered unequal by the occurrence of small granulations or little sarcomatous enlargements, which appear to have their origin in the inflammatory process from which that part has been suffering. Distinct fungous excrescences, or the development of tumors of a large size, sometimes result from the prolonged existence of acute purulent ophthalmia. And finally, in many instances, enlargement of the sub-mucous glands and of their cryptæ, evidently produce an unequal, and as it is somewhat imprecisely termed, a granular condition of the conjunctiva. Sometimes the conjunctival vessels remain enlarged—in an atonic state,—and this enlarged or varicose state of vessels is usually spoken of as chronic ophthalmia.

2. *Ectropium.—Entropium.—Tinea.—Lippitudo.*—During the existence of chemosis the eye-lids are everted, and it will sometimes happen either from an enlarged state of the conjunctiva and its subjacent cellular membrane, or from a new direction given to the tarsal cartilage, that this eversion of the palpebræ continues, and, in short, that regular ectropium is established. On the contrary, the union of the ulcerated points of the chemotic surface, or the acquirement of certain morbid adhesions on the part of the subconjunctival cellular membrane to surrounding

parts, may induce a state of entropium. Entropium will sometimes result from collapse of the eye-ball, or staphyloma of the cornea. When the inflammation extends to the tarsal margins, when the meibomian glands are diseased and enlarged, tinea may be induced, and if this disease continues and is combined with an ulcerated state of the skin at, and around, the root of the eye-lashes, an obstinate form of lippitudo may be produced.

3. *Thickening, opacity, and vascularity of the conjunctival covering of the cornea.*—It is scarcely necessary to mention, that if the palpebral conjunctiva become rough and granular, the friction of this irregular body upon the membrane covering the cornea will excite great irritation; the effect of prolonged irritation upon this delicate texture will be to give rise to inflammation, a sort of slow chronic inflammation, which generally involves the thickening, opacity, and vascularity of its textures. The part becomes inflamed as a result of continued irritation, the inflammation causes a deposition of an opaque matter resembling lymph, this lymph becomes organized, the vessels which organize it remain, and hence the thickening, the vascularity, and the opacity, of the inflamed surface. It rarely happens that that portion of the conjunctiva which covers the first layer of the cornea, becomes inflamed in the first instance, independently of the irritation arising from the friction of a rough body upon its surface, but this may occur, and in such instances the thickening and opacity usually subside on the decline of the inflammation of the mucous covering of the cornea, which may be generally subdued by proper remedies. The distinction between these two states, with respect to facility of removal, is evident enough. The granular state of the conjunctiva is somewhat slow of removal, and the disease it excites is severe, and even when the morbid

condition of that membrane is removed, the disease of the surface of the cornea is pretty much in the same state as in the instance of thickening, vascularity, and opacity, of the conjunctival covering of the cornea, unassociated with disease of the palpebral conjunctiva. Thus, then, the diseased state of the corneal surface may be a primary affection, or it may result from the morbid condition of those parts which move upon it.

4. *Opacity of the cornea.*—The cornea may be rendered opaque either by irritation of its surface, by inflammation of its texture, by deposition between its lamellæ, or by ulceration.

5. *Ulceration of the cornea.*—The cornea may ulcerate in the progress of this affection, and on the extent and seat of such ulceration many important effects, as respects vision, will depend. If the ulceration be deep, the aqueous humor may be discharged, and the iris may become prolapsed, or it may become permanently adherent to the ulcerated margin. At all events, irremediable leucoma will be the consequence. If the ulceration be extensive, though not deep, a slight nebula only may take place, or, if more profound, staphyloma may ensue.

6. *Bursting of the cornea.*—When the cornea is much weakened, whether by impaired resisting power occasioned by inflammation, or by attenuation from ulceration, or loss of substance by sloughing, it may burst, and many instances are mentioned in which the greatest relief has been obtained by the bursting of the cornea and the evacuation of the aqueous humor in the progress of acute purulent ophthalmia. It must be remembered, that in the course of acute inflammation of the eye, the muscles become irritable and spasmodic in their action, so that when some of the corneal layers are detached by ulceration or sloughing, and the eye-ball, and especially its

chambers, are unusually full and tense, the cornea is very liable to burst, if from undue exposure to light, a sudden accession of pain, or, on a forcible attempt to examine it, the muscles of the eye-ball suddenly and powerfully contract. Bursting of the cornea, during the accession of severe pain, occurred in some of the cases of purulent ophthalmia mentioned by Dr. Vetch, and he states that "any visible alteration in the cornea is an event subsequent to its rupture." I believe this opinion to be altogether incorrect. I do not think the cornea will rupture under the action of the muscles of the globe if its texture be previously healthy. If rupture of the cornea could take place when simply exposed to the pressure of the parts it encloses, and the spasmodic action of its muscles which may accompany such pressure, it ought to have occurred in the instances mentioned by Wardrop, Ware, Macgregor, Fielding, and many others, in which the great pressure it sustained was unequivocally manifest, the anterior chamber was unusually ample, the cornea appeared prominent, and the sense of tension of the globe was remarkably distressing. A blow upon the eye, though frequently producing rupture of the sclerotica, rarely occasions bursting of the cornea, unless the instrument by which the injury is produced be somewhat sharp and angular, und unless the blow be inflicted immediately upon the more prominent part of the cornea. In nineteen cases out of twenty in which an accident of this kind (a blow upon the eye) takes place, although, from the situation of parts, the cornea must generally receive the direct force of the blow, laceration of the sclerotica alone takes place; at least, the cornea is not ruptured at the same time. Dr. Vetch explains very minutely the changes which occur after the bursting of the cornea. He says, when this takes place the pain is at once relieved. Of course, the same relief

would follow the discharge of the aqueous humor, in this instance, as would result from an opening in the cornea as advised by WARDROP. And if it were once proved that laceration of the cornea occurred in the progress of this disease, independently of change in its texture, the treatment of MR. WARDROP would be as necessary and beneficial as I now believe it to be improper and hurtful. DR. VETCH has very elaborately described the changes which occur in the cornea after its laceration, but I can only learn from his statement that it very generally becomes staphylomatous, just as might *a priori* have been expected, or, to use his own words, "this rupture of the cornea generally produces impartial (partial?) and irregular tumors, and, in a few cases, the whole circumference of the cornea has been observed to project." (P. 60.)

7. *Staphyloma of the cornea.*—Whenever the resisting power of the cornea is impaired it is liable to become staphylomatous. This impairment of resisting power may result from a change wrought in its texture (not evinced by any *visible* alteration), by inflammation, by ulceration, by sloughing, and also by lymphatic deposition between its lamellæ. When lymph or other matters are effused between the lamellæ of the cornea, these lamellæ are absorbed, in a certain degree, by the pressure they sustain, and the strength of their texture appears to be impaired by the constant contact of these morbid depositions or effusions.

8. *Sloughing of the cornea.*—When sloughing of the cornea takes place in the progress of purulent ophthalmia, it is not generally from the occurrence of inflammation of that tunic, but from the interruption to its nutrition owing to the compression caused by the chemosis. Severe and prolonged chemosis causes mortification in the case in question, as I apprehend, because it generally takes place

where such chemosis exists in its severest form. Sloughing of the cornea is more frequently associated with chemosis than with any other affection of the organ of vision. And it may be mentioned, in additional evidence of the truth of this position, that in all such instances the mortification begins in its superficial layers. Each layer of the cornea appears to have a certain dependance on its neighbouring lamina, many of its nutrient vessels ramify in the connecting cellular membrane, and, when this is destroyed, a part of its means of vitality is taken away. When one layer of the cornea sloughs, its infrajacent cellular membrane soon perishes, this hastens the death of the circumjacent cornea, and in this way the death of some new part of the cornea is almost certainly secured, or at least much assisted by the destruction of another.

9. *Prolapse of the iris.—Synechia anterior.*—Ulceration or sloughing of the cornea may cause prolapsus of the iris. If mortification of the cornea proceed to a great extent, the prolapse of the iris will constitute but one of many changes which will subsequently occur, and will probably terminate in the loss of vision. If the iris be prolapsed through a small ulcerated opening in the cornea it may happen, if the ulcerative process be checked, that the part may be withdrawn by the use of the nitrate of silver or the application of belladonna, or it may slough, and in either case it may become adherent to the margin of the ulcer and will constitute synechia anterior. The changes which the prolapsed iris may undergo, will be discussed when I speak of the diseases of the cornea and iris.

10. *Suppuration and Collapse of the eye-ball.*—Purulent deposition within the eye-ball may result, in the instance under consideration, fron deficient nutrition or from inflammation. Purulent ophthalmia may originate ophthalmitis and this may give rise to inflammation, so

that, in very acute inflammatory affections of the organ of vision, (such as purulent, gonorrhœal, and traumatic ophthalmia) suppuration of that organ is liable to take place. Suppuration of the eye-ball is always followed by collapse of the globe, but I have known this state of collapse occur after purulent ophthalmia quite independently of suppuration; the part has wasted without any definite cause so far as could be ascertained. There has occurred, in fact, a state of gradual and complete atrophy after the previous existence of acute inflammation.

These are nearly all the modes in which this disease terminates that I am acquainted with, and you will learn from their variety and importance, the necessity of promptly subduing those acute symptoms, the continuance of which is liable to be followed by effects so injurious and, in many instances, so destructive to vision.

Diagnosis.—Purulent ophthalmia has a certain degree of resemblance to catarrhal and to gonorrhœal inflammation of the conjunctiva. I have already entered pretty fully upon the means of distinguishing the former from purulent ophthalmia, so that it only remains for me to speak of the means of distinguishing *gonorrhœal* from acute *purulent* ophthalmia.

Gonorrhœal ophthalmia may be distinguished from purulent, by the nature of its cause, the great degree of chemosis which attends it, and also by the extreme tumefaction of the eye-lids. It has been said that the colour of the discharge will materially assist your diagnosis, and you will not certainly remark that thin pale appearance of the secretion at the commencement of acute gonorrhœal, which is observed at the onset of purulent ophthalmia; but then it must be remembered that there are certain varieties, or, if you prefer it, certain degrees of gonorrhœal ophthalmia, the mildest of which are scarcely

to be distinguished, as respects this quality of the discharge from the conjunctiva, from that accompanying the acute purulent inflammation of that membrane; it has been also remarked that the amount of discharge is greater in the former of these diseases than in the latter, but you would be unwilling to rely on a diagnostic sign so uncertain and indecisive. If a patient had extreme swelling of the lids, with profuse puriform secretion, great chemosis, and severe pain in the eye and head, after having been exposed to the risk of applying gonorrhœal matter to that organ, and if these symptoms had arisen suddenly and established themselves rapidly, in the absence of any similar disease in the neighbourhood in which your patient resided, you would be justified in referring their origin to gonorrhœal infection, and you would be confirmed in this opinion if your remedies did not exert a favourable influence on the inflamed organ; for, it is an unquestionable fact, that gonorrhœal ophthalmia is a much more intractable disease than purulent inflammation of the conjunctiva. To recapitulate—*gonorrhœal*, is distinguished from *purulent* ophthalmia, by its origin from gonorrhœal contagion; its greater degree of chemosis and tumefaction of the lids; the consistence of the discharge at the commencement and close of the disease being nearly the same; the extreme degree of deep-seated pain of the eye-ball and head; and by the destructive tendency of the disease. Purulent ophthalmia, as compared with gonorrhœal, is attended with a less degree of chemosis and palpebral swelling, there is less discharge, and also less deep-seated pain of the eye-ball, and seldom any great degree of hemicrania; the colour and consistence of the puriform secretion is variable in the different stages of the disease; it is more generally manageable by treatment, and when contrasted with the results of gonorrhœal ophthalmia, it is much less frequently fatal to vision.

Prognosis.—If you are called to a case in which the chemosis is not very great, nor the pain intense and deep-seated, nor the transparency of the cornea much impaired, you would expect to preserve the eye with merely a slight, and perhaps only a temporary impediment to vision ; but if the pain be considerable, the cornea cloudy, and the chemosis great, you would apprehend serious injury to vision; and if the chemosis nearly concealed the cornea, which, as far as could be judged, was of a dull ashy colour, and if the tension of the eye-ball and the sense of pain and throbbing were severe and deep-seated, you would relinquish every hope of restoring any useful degree of sight, and be prepared to expect the occurrence of sloughing of the cornea or suppuration of the eye-ball. Such are the chief circumstances which would determine the character of your prognosis, although many other events would very properly modify your opinion respecting the result of any case of this nature, the management of which you may be called upon to undertake; such, for instance, as the state of the individual's health prior to the attack, his constitutional peculiarities, and his capacity to bear the necessary treatment.

Causes.—In reading the accounts of the Egyptian ophthalmia,* you will remark the great severity of its symp-

* See, upon this subject, various *papers* in the third, fourth, seventh, and twelfth volumes of the *Edinburgh Medical and Surgical Journal.* Also several valuable communications in the sixth, seventeenth, nineteenth, and twenty-ninth volumes of the *London Medical and Physical Journal. An Account of an Ophthalmia which appeared in the second regiment of Argyleshire Fencibles in* 1802; *with some observations on the Egyptian Ophthalmia:* by A. Edmonston, M.D. *Remarks on the Purulent Ophthalmy which has lately been epidemical in this country:* by James Ware, London, 1808. *Observations on Ophthalmia and its consequences:* by Charles Farrell, M.D., London, 1811. *Attempt to investigate the cause of the Egyptian Ophthalmia; with observations on its mode of cure:* by George Power. *An Account of the Ophthalmia which has appeared in England since the return of the British Army*

toms, and the very destructive extent to which it frequently proceeded, but there are no events connected with its origin, its symptoms, its mode of termination, or the treatment required for its cure, which render it probable that it differed in any *essential particular* from the purulent ophthalmia which we are now considering, in its severest form. There are indeed many circumstances connected with the soil, the atmosphere, and the physical and moral condition of the sufferers, which favoured its extension and increased its severity, but the same events exercise an important influence over every other form of disease; and I apprehend we ought not to consider *mere degree* of disease to alter its nature—surely iritis or conjunctivitis are not otherwise than the maladies their names import, because they may chance to be unusually severe.

If you refer to those authors, who appear to have paid the greatest attention to the Egyptian ophthalmia, and who, owing to their residence among the affected troops, had ample opportunities of observation, you will find that they either directly or indirectly admit the agency of many circumstances in producing, aggravating, or rendering susceptible of, the disease. They do not contend that the unaided operation of contagion, and it alone, gave rise to the ophthalmia during any period of its most fatal prevalence; but, on the contrary, admit the assistance that cause derived from other agencies, and also, that in many cases it appeared to originate where the existence of contagion was extremely doubtful, and in some instances, apparently impossible. You will find that the earliest symptoms of the disease, (as described by those who had the manage-

from Egypt: by J. Vetch, M.D. Mr. Macgregor in, *Transactions of a Society for the improvement of Medical and Chirurgical Knowledge*, vol. iii.

ment of the diseased troops in Egypt, and in various parts of England) were, a sensation of sand beneath the lids and a well-marked vascularity of the mucous lining of the lower lid, (FORBES, WALKER, VETCH, PEACH, MACGREGOR,) and if you will carefully peruse the observations of the medical attendants of the troops abroad and at home, you will be satisfied that the identity of the disease with which both were affected is most satisfactorily proved.

The Egyptians are in the habit of tying a bandage over their eyes at bed time, during the prevalence of this ophthalmia, with a view of preventing the ill effects arising from a damp state of the atmosphere, and possibly also to screen them from the hazard of contagion, which, from the occasional very great prevalence of this disease, is very generally incurred at such seasons, and this precaution is strongly commended by some gentlemen who have very well described the Egyptian ophthalmia and its mode of treatment.

Some writers have ventured to assert that this disease is propagated by contagion alone, while others deny that it is ever produced by such a cause; these are of course *extreme* opinions. If you will carefully examine the mass of evidence relating to this subject, I think, you will conclude that it *may* be produced by contagion, but, inasmuch as it usually attacks those whose health is disordered, whose constitutions are feeble, whose habits are not cleanly, and who are placed in circumstances unfavourable to vigorous and perfect health, it is materially assisted in its operation by other circumstances. On the other hand you will be convinced that it may arise spontaneously, or at least, independently of the action of contagion, although the latter is by far the most common cause of its origin and extension.

It has been said that there is in some persons an here-

ditary predisposition to the disease, and it has also been said that the atmosphere becomes so changed to a certain extent around a patient whose eyes are affected with acute purulent ophthalmia, as to be capable of giving rise to the same disease in others (MUELLER and EDMONSTON,*) but we are as yet unacquainted with any facts by which either of these statements are established, and we may confidently assert that if they be not altogether erroneous, they are at present little else than conjectures, unsupported by any approach to satisfactory evidence.

In order to decide the fact of the contagions or non-contagious nature of purulent ophthalmia, a gentleman named MACHESY, who had resided with the troops in Egypt during the prevalence of that severe disease, applied to his eyes a piece of linen well soaked in the secretion from the eyes of three patients who were suffering from this affection, and afterwards walked out a mile or two, a sirocco wind at that time blowing the dust and sand in every direction; he reapplied the soaked linen on his return, and wore it during the night, occasionally moistening its surface and pressing it to the eyes to insure its contact with their mucous surface—but no severe inflammation followed. (*Edin. Med. and Surg. Journal*, October, 1816, vol. xii.)

Nothing satisfactory however is proved by an experiment of this kind upon one individual, inasmuch as many persons obtain an absolute immunity from some diseases whose contagious nature is established beyond dispute. It would be obviously absurd to deny that a disease possesses a contagious property merely because it is not communicated to *every one* who is brought within the

* *An Account of an Ophthalmia which appeared in the second Regiment of Argyleshire Fencibles, in the months of Feb. March and April* 1802; *with some observations on the Egyptian Ophthalmia:* by A. EDMONSTON, M.D.

sphere of its influence, for, if this reasoning were admissible, there exists no such thing as a contagious disease; if several infants who have never been vaccinated were exposed to the contagious influence of small pox, it is probable that not even a moiety of the number would be affected with the variolous malady, yet who on this account would be disposed to deny that small pox is contagious? It is stated by Mr. Reid (see his letter to Dr. M'Gregor, published in the 17th vol. of the *London Med. and Phys. Journal*) that Mr. Marshall applied to his conjunctiva some of the discharge from an eye affected with purulent ophthalmia, "which produced considerable smarting pain for the space of an hour, but the disease did not establish itself. He communicated the infection to three other men, two of whom had the regular disease." Vasani and Graefe produced the disease in dogs, and Guillié and Kirkoff in the human subject, by inoculation.

I have known nurses affected with purulent ophthalmia from syringing the eyes of adult patients suffering from the same disease, a portion of discharge from the eye of the latter having come in contact with that of the nurse. A similar accident has occasionally happened to medical students, and this occurrence has been observed by Mr. Macgregor,* Dr. Vetch (74), and many others; I have also known the discharge applied to the eye of a healthy individual who was engaged in the performance of the same duty (syringing the purulent eye of a patient) *without being succeeded by any inflammation;* he has complained of smarting at the moment of contact, but it has soon subsided, and has not been followed by any other unpleasant sensation.

* See his Remarks, &c., in *Transactions of a Society for the improvement of Medical and Chirurgical Knowledge.*

From an ample consideration of the subject, I should be disposed to conclude that:—First.—Contagion alone will not generally produce this form of purulent inflammation of the eye, but requires to be aided in its operation by many circumstances, of which we may enumerate constitutional susceptibility or aptitude—want of cleanliness—disordered health—exposure to a brilliant sun, or to the damp night air, or to dust, or peculiar conditions of the atmosphere, the dense moist atmosphere being most prejudicial;—all, or any of these circumstances will generally insure the operation of contagion. Secondly.—Purulent ophthalmia may arise without the aid of contagion, as occurs in many instances of relapse, and in some of those cases in which one eye becomes affected as soon as the other has nearly recovered; and I may mention that the disease has occurred to a ship's crew during their voyage, whose eyes were not affected at the time they commenced their voyage, nor until some time afterwards, and who had no communication with the men of any other vessel until the completion, or nearly the completion, of their voyage. Let me not forget to mention, that many persons apply for relief who are suffering from purulent ophthalmia in its most severe and unequivocal form, and who are quite unconscious of having, for a long time previous to the occurrence of the inflammation, seen or associated with any one affected with a similar disease.

I need not explain what is meant by constitutional susceptibility or aptitude for disease; you are familiar with the fact in reference to small-pox, measles, scarlet fever, syphilis, and so on, and you well know that many persons may be exposed to the influence of contagion, while only a small portion may suffer from it, or rather from the disease, to which, according to its nature, it has a tendency to produce; and having observed this fact, you

will be anxious to know what are the circumstances of those persons which render them susceptible of the mal-influence of that agent which is innoxious to others? and what is the condition of those who obtain an exemption from a disease to which others, not more exposed to its influence, are signally obnoxious? This is a matter well worthy your assiduous investigation, and one which has not yet received that attention its importance demands; but, although it is my duty to allude to it on the present occasion, I must content myself with an allusion merely, as it involves an inquiry only collaterally connected with our present subject.

Want of cleanliness is another cause that we must not omit to mention on the present occasion, for, an attention to cleanliness, on the part of the patient, will not only assist our other remedial measures, but will, in many instances, enable us to limit the extension of a disease which might seriously injure the vision of a large proportion of the poor (for to such it is in a great measure confined) of the district in which it may happen to appear.

If you will read the statement of Mr. Peach, in the fourth volume of the *Edin. Med. and Surg. Journal*, you will find that those men suffered most severely from purulent ophthalmia, whose health had been disordered by irregularity and intemperance, and who had been long exposed to the influence of a brilliant sun and the injurious agency of keen winds. He alludes to the subject in the following terms:—"In June and July, 1805, many predisposing and exciting causes existed at Hythe. I need not inform you what *regularity* and *subordination* exist in a corps whilst volunteering for general service goes on, and every soldier has ten guineas to get rid of. Recruits and young soldiers at frequent drills were exposed, for a great part of the day, to the heat of the sun.

From the situation of Hythe barracks, the men found the dust very troublesome, in the windy weather which we then had. I believe I need not adduce more occasional causes of this disease."

A damp dense condition of the atmosphere will not only act as a cause, but will also materially favour the extension and aggravate the symptoms of purulent ophthalmia, (LARREY, ASSALINI, GUILLIÉ, SAVARESI, FORBES, REDMOND, SMITH, VETCH, MACHESY, MACGREGOR,) even admitting that it is excited by some other agent. Many patients experience the influence of such changes in the state of the weather most severely, and we have frequent opportunities of witnessing an exacerbation of the disease, when it has been nearly removed, from no other cause than the changed condition of the atmosphere. DR. VETCH relates a very remarkable fact in illustration of this. He says, "the disease had been disseminated at the Riding-street barracks by the 54th regiment of foot, but had not produced a single instance of its violent form until the 24th of September, when, after a very heavy fall of rain during the night, *to which the men affected with the ophthalmia were more particularly exposed*, by being at the time under canvas, the whole number of patients, to the amount of 34, were found in the morning with their eyes completely closed by the swelling of the palpebræ, attended with the excruciating pain, the purulency, and other symptoms of the disease in its most alarming and inveterate form." As you will be anxious to be acquainted with the series of events, and the nature of the facts, by which DR. VETCH detected, or believed he detected, the influence of a moist atmosphere in aggravating and favouring the extension of acute purulent ophthalmia, I must refer you to his paper upon this subject in the fifth volume of the *Edin. Med. and Surg. Journal.* You will soon

have sufficient experience of the same fact among your own patients, and will be constrained to acknowledge the baneful operation of that agent or that condition of atmosphere to which your attention is now directed, by the repeated failure of your curative means when such a condition of atmosphere prevails and your patients expose themselves to its influence.

It has been stated by Sir W. Adams that the contagious property of the disease resides in the granulations of the conjunctiva, but I apprehend, if the application of the discharge is competent *per se* to excite the disease in the mucous membrane of an eye to which it may be applied, it is not material from what part of the infecting membrane such discharge be taken.

At what stage of the disease is the contagious quality of the discharge most active?—It is doubtful whether or not this disease is contagious in its chronic form; I believe the point is not settled, and my own opportunities have not enabled me to give any decisive opinion upon the subject; but I am inclined to believe, that if matter were taken from an eye affected with purulent ophthalmia in its chronic stage, and applied to the mucous membrane of a healthy eye, no similar disease would be produced. Mr. Macgregor states that "the Egyptian ophthalmia, though probably contagious in its early and active stage, is not so in its chronic state."

"In March, 1802, fifty-six men of the Coldstream Guards returned from Egypt, labouring under ophthalmia; some had irrecoverably lost the sight of one, or both eyes; others had partially lost the sight of one eye, and several had great weakness of the eyes, with a constant discharge of tears. The men were put into a detached hospital, and were attended regularly for three months by Mr. Knight and myself. Their friends, in consequence of their long

absence, and very distressed situation, were allowed to visit them daily; yet none of these persons, or of the servants connected with the hospital, took the disease. If any of the servants of the hospital had taken the affection, we must have observed it; and if any of their friends had caught it, they would most probably have applied to us for our advice; neither of which happened." (*Transactions, &c.* p. 88.)

How soon after the application of the matter of contagion does the disease usually appear?—Upon this point we have no very precise information. Mr. Mackenzie says "the disease appears to commence *soon after* the application of the contagious or infectious matter to the conjunctiva." (P. 337.) Mr. Macgregor mentions three instances in which nurses accidentally introduced some of the matter from a purulent eye into their own. In the first instance the eye "became red and painful" five hours after the contagious matter had been applied. In the second case, "the eye began to itch to such a degree, that the patient could not refrain from rubbing it," ten hours subsequent to the application of the puriform discharge. In the third example, "itching of the eye," &c., occurred seven hours from the period of inoculation.

Treatment.—In calling your attention to the treatment of acute purulent ophthalmia, it will be scarcely necessary to insist upon the necessity of employing those remedies which quickly and powerfully reduce the general fulness of the system; if such remedies be not employed with promptitude and judicious perseverance, loss of vision will be an almost inevitable result. Dr. Vetch strongly insisted upon the propriety of bleeding so as to produce syncope, and he remarked that whenever he saw a case early, and had recourse to this measure without loss of time, his treatment was most successful, whereas, if he

contented himself with withdrawing a large quantity of blood without inducing *positive syncope*, he generally found it necessary to repeat the operation, so as eventually to detract a greater amount of the circulating fluid than in the former case, and, even then, not uncommonly experienced the mortification of witnessing the loss of an organ, which a more decided and energetic treatment might have saved. It was his rule to bleed in these cases, *ad deliquium animi*, regardless of the quantity of blood it might be necessary to remove for this purpose. The opinions of Dr. Vetch may be pretty correctly ascertained by the following extract from his book:—"In this stage (the violent form of purulent ophthalmia) the patient will often have bleeding to a greater extent; in many, fifty or sixty ounces must be taken away to relieve the pain, or bring on syncope; but we can always rely with certainty on the benefit which will ensue when either of these effects are produced. In every case, where such practice is employed, however violent the tendency of the disease may be, its fatal termination will infallibly be prevented, and with much less expense to the patient, than by smaller and more frequent bleeding." (P. 101.)

Mr. Peach was of the same opinion, and he tells us that in one case he was obliged to abstract 77½ ounces of blood before syncope occurred. He further adds, "I sometime ago thought this disease (Egyptian ophthalmia) ungovernable. On the first appearance of the disease I used venesection and the antiphlogistic treatment. Being unsuccessful, I gave trial to bark and stimulants; but, being still more unsuccessful with this mode of treatment, I reverted to the antiphlogistic in its fullest extent, and with the greatest success. To my infinite satisfaction, I have discovered that I did not formerly succeed, because I did not carry this mode nearly far enough.

"It is in the commencement of this disease that a very large quantity of blood should be extracted; in that stage, large venesection, even *ad deliquium animi*, is almost an infallible remedy. It is not sufficient to abstract 20 or 30 ounces of blood. I have taken 60 ounces very frequently; enjoining perfect rest; avoiding the smallest portion of animal food; and putting in practice every other part of the antiphlogistic treatment." (*Edin. Med. and Surg. Journal*, vol. iii. p. 54.)

"I have, in many cases," says Mr. FARREL (on the treatment of Egyptian ophthalmia), "taken from the temporal artery from thirty to fifty ounces of blood in the space of the first twenty-four hours of the disease."

Remember, these are the opinions of men who had the most ample opportunities of seeing the disease in its severest forms, whose experience upon the subject was most extensive, and whose practice, after the adoption of this plan, must be considered, when compared with the results of former methods of cure, most successful.

The success of different plans of treatment is somewhat curious, but the average evidence of the various methods of management, is certainly strongly in favour of the employment of depleting measures. Bleeding was eminently successful in the hands of DR. VETCH, DR. SAVARESI, and MESSRS. KNIGHT REID, MACHESY, PEACH, and WAUGH. DR. SAVARESI is stated to have cured all except two, out of about a thousand cases of Egyptian ophthalmia which were under his care. His treatment consisted of copious bleeding, cooling applications, and astringents. By the adoption of active depletive measures, MR. MACHESY lost only one eye out of 193 cases which he treated, and which occurred in the 62nd regiment. (P. 415.) Out of more than three thousand cases treated by BARON LARREY, not one lost his eye-sight. The essential part of his treatment

consisted of general and topical bleeding. On the contrary, Dr. Shortt, who treated the disease very extensively in the military hospitals of Egypt and Sicily, carried venesection to a very great extent—to the extent of removing, in some instances, 200 ounces of blood, and often without checking the progress or mitigating the severity of the disease. He subsequently employed with a great measure of success, the nitrate of silver in solution with the internal administration of tonics and stimulants. Dr. O'Halloran says "I can safely say, that abstraction of blood will be rarely necessary in this disease (acute purulent ophthalmia;) if the plan recommended (the local application of the sulphate of copper) be strictly attended to; and I moreover am of opinion, that if any inquiry be instituted among the army-surgeons, it will be found that those, who used the greatest depletion, were the least successful practitioners, and that sloughing, ulcers, &c. more frequently succeeded the evacuating plan, than when the patient was partly left to nature." The success of Dr. Halloran's treatment as represented in his book, was very great. On the other hand Sir W. Adams states that his treatment by the administration of emetics so as to produce and maintain vomiting for eight or ten hours was almost invariably successful, and Mr. Lewis fully corroborates Sir William's statement. Mr. Headley found the administration of bark, very successful. Mr. Okes met with a large measure of success by dropping the tincture of opium into the eyes every two or three hours. Mr. Shaw produced the greatest benefit by inserting beneath the lids the mucilage of quince seed.

I am disposed to believe that some of these last mentioned gentlemen were not called upon to conduct the management of the true acute purulent ophthalmia, for, as far as a very extensive experience on my part has placed

me in a condition to deliver an opinion upon the subject, no measures short of pretty free depletion, can be relied upon for the purpose of subduing this formidable malady when it occurs in strong plethoric persons. However, you should be guided in your treatment by the symptoms of each particular case, nor should you suffer any rule which may be laid down by authors or lecturers, to supersede the exercise of your own judgment upon this important point of practice.

If the symptoms be severe, and the patient tolerably strong, bleed until the pain is relieved, the chemosis diminished, and the sense of tension and throbbing removed, and afterwards apply a quantity of leeches close to the tarsal margin of the lower eye-lid. You will thus mitigate that state of congestion or local vascular fulness which is usually present, and, at the same time, remove that state of the system which would be likely to maintain or reproduce it, and thus prevent that distension of the blood vessels, which, if unusually obstinate in duration, generally destroys or much impairs their tonicity, and thus lays the foundation of those chronic diseases, with which, after acute inflammation long continued or inefficiently treated, the eye is so liable to be affected; and also disposes that delicate organ to frequent relapses of acute inflammation, from causes totally inadequate to produce them, if the eye be in a healthy and unimpaired state at the time of their application. Whilst upon this subject, let me not forget to mention, that scarifications have been much recommended, particularly at an early stage, as being an excellent mode of relieving the vascular plenitude of that part in which the disease is first evinced, and from which it frequently extends. Dr. Edmonston says, "I am fully persuaded, that if there be any means of arresting the progress of inflammation, in that violent and destructive

variety of ophthalmia (the purulent), it is scarification of the vessels on the globe of the eye itself; and when performed early, and duly repeated, I have *never* known it fail of success."* When you reflect that this mode of relieving the inflamed organ, in one of the most acute diseases to which the human eye is subject, is recommended almost to the total exclusion of general bleeding, you will not fail to recognize the author's enthusiastic fondness for a favourite remedy. Early and free scarification was also practised by Mr. Forbes, Mr. Goodlad, Mr. Roberton, and Dr. Walker. Let me advise you not to employ scarifications unless the chemosis be considerable, however great may be the vascularity of the conjunctiva, for such a mode of practice will not only betray a blind reliance on an unimportant means of cure, and thus tempt you to be less attentive to more valuable means of relief, but will also inflict much pain, and excite great irritation upon the scarified surface. If, however, the chemosis be considerable, you would, of course, freely scarify the chemotic surface, not with the view of superseding general depletion, by lessening vascular fulness, as stated by Dr. Edmonston, but with the intention of preventing sloughing of the cornea, suppuration of the eye-ball, and the many evil consequences upon the conjunctiva which have been previously mentioned. As a means of aiding the operation of bleeding, or of diminishing, as much as possible, the necessity for removing blood, colchicum, digitalis, or tartarized antimony may be administered, but it will not be forgotten that these medicines are simply prescribed for the purpose of lowering the circulation.

I am not aware that mercury given to the production of

* *A Treatise on the varieties and consequences of ophthalmia, &c.:* by A. Edmonston, M.D., London, 1806.

ptyalism is at all serviceable. At an early period of my practice I gave it a fair trial, but not, of course, from any suspicion that the disease was, in the remotest degree, allied to syphilis. Inflammation of mucous membranes is not generally so much amended by mercury as that of many other textures, and particularly those of a serous character. Rust strongly recommends the free use of mercury in this variety of ophthalmia, but its liberal administration is condemned by Vetch, Walther, and Lawrence. I do not, however, mean to say that, in the event of the inflammatory action extending to other parts, and declining in the conjunctiva, the use of mercury would always or generally be improper.

You would deem it necessary to keep the bowels well relaxed, suiting your medicine for this purpose to the general habit and other circumstances of your patient; pills composed of the blue pill and the compound extract of colocynth with sometimes a small quantity of tartarized antimony, have proved very useful in my own practice.

Local applications.—The local applications must vary in their qualities, and in the state in which they are used, as in other instances; generally speaking, the common alum wash or goulard water, made twice its usual strength, will answer the purpose, but it may be necessary to use remedies possessing more soothing qualities. There are surgeons who prefer the use of strong local stimuli at the commencement of the disease; a strong solution of the nitrate of silver (Ridgway, Melin); the tinctura opii (Ware, Okes); the sulphate of copper (O'Halloran); the undiluted liquor plumbi acetatis (Vetch); the oleum terebinthinæ (Briggs); and the diluted sulphuric acid (Mueller), have had their respective advocates; and I have previously stated that Mr. Guthrie is in the habit of using a strong ointment composed of the nitrate of

silver mixed with lard, or the unguentum cetacei, in nearly every form of inflammation of the conjunctiva attended with increased discharge from its surface, at the commencement and at almost every future stage of the disease, but I cannot speak favourably of any of these applications as early remedies, that is—as remedies employed, when the symptoms are completely established—although they are undoubtedly extremely useful, as soon as the acute symptoms are subdued, when the vessels of the eye remain enlarged, and the conjunctiva has a loose relaxed appearance. The early stimulant plan is certainly to say the least, equivocal practice, and is also very painful and uncertain in its operation, and will occasionally disagree so much that by the time you have discovered its injurious tendency, it will be too late to prevent the mischief, such a mode of practice has occasioned; you cannot, as Mr. Ware advised, discontinue the use of stimulating applications, and after having bled, purged and lowered your patient, resume them again; the mistake will be fatal to your patient's vision, for the only opportunity of diminishing the extreme extent of inflammatory action by proper and efficient means has passed away in the employment of irritating and injurious remedies; as therefore you cannot tell beforehand, with certainty, in which cases these harsh applications will be suitable, and those in which they will disagree, it would be improper to use them at this hazard, while you possess in antiphlogistic means, remedies whose powers have been ascertained, and may be always safely employed and trusted.

Mr. Forbes, an army surgeon of great experience and accuracy of observation, reprobates the practice of employing stimulants at an early stage, and before the acute symptoms have been subdued and Mr. Peach (another military surgeon), after having tried the effect of local stimuli very

extensively at an early stage, pronounced them to be injurious, and remarked, that since he had desisted from the practice, there had been fewer cases of *inversion of the lid.*

Now, Doctor Whyte, who had seen a good deal of *Egyptian ophthalmia*, as it has been termed, fancied that many of its phenomena were referable to the influence of the sun, by which the humours of the eye were expanded, and in accordance with this view of the cause of the disease, he recommends a particular mode of treatment, of the propriety of which some idea may be formed from the following extract from his published paper:—"I would have also touched the ball of the eye every morning and evening, or oftener, with some astringent or stimulating tincture, &c., or to supersede every other remedy, and strike at the root of the disease at once, I would have *pierced through the tunics with a couching needle*, and entering the posterior chamber of the aqueous humor by an incision, parallel to, and behind the iris, permitted an outlet proportioned to the existing *expansion.*"

Presuming that the disease having been acute has been rendered much milder by the aid of antiphlogistic treatment, or that it has degenerated into a chronic state, or exists only in a very slight degree, it will be necessary to use local astringent, and stimulant remedies, such as the zinc wash, or a solution of the nitrate of silver; and it will be advisable to employ, at this season, some form of counter-irritation, such, for instance, as a blister at the nape of the neck, or behind each of the ears, recommending, at the same time, an avoidance of all means calculated to aggravate the malady, and particularly any irregularity of diet or any undue exposure of the eyes to the influence of a cold, moist atmosphere. When the palpebral conjunctiva merely remains slightly inflamed, thickened and

irregular, and discharging a thin, pale, tenacious, gleety sort of matter, it may be right to evert the part every night and morning, and having carefully cleansed it, apply, with a camel hair pencil, a solution of the sulphate of copper (four grains to the ounce of water) to the morbid surface; if this prove insufficient to remove the disease, the strength of the solution may be doubled or the blue-stone may be applied in substance.

M. Sonty has recently stated in a report made to the Minister of the French Marine, that he has derived the greatest advantage from the use of a solution of rock alum as a local application in acute purulent ophthalmia. He took a piece, with which he kept stirring, for eight or ten minutes, the white of an egg, which is then to be put into a fine muslin bag. When this is to be used, the patients head must be held back, and, while the eye-lids are kept open, a few drops of the liquid are to be squeezed from the bag upon the eye; this operation must be repeated very frequently—in some cases every half-hour. The same treatment is applicable in all the stages of the disease, and generally cures it in from twenty-four to forty-eight hours.

If suppuration of the eye-ball and sloughing of the cornea have commenced, you would cease to adopt active anti-phlogistic remedies. Under these circumstances, the powers of the system will be fully required, and it will be your duty to maintain, and not to diminish them. For this state of things warm anodyne fomentations are required, and if the external tunics of the eye do not give way, if much matter is contained and confined in the globe, it would be most desirable to puncture it—at all events, the patient must not be allowed to endure the agony which is so often experienced prior to the rupture of the external coats of the eye, when that organ is in a state of suppuration. The eye-ball is punctured, not with

a view of restoring sight, but with the intention of removing tension and relieving pain.

With regard to the dietetic part of the treatment, there is little to be said;—the state of the symptoms and the stage of the disease, conjoined with the patient's usual mode of living and his habit of body, will be the chief circumstances influencing your judgment as to the extent to which you may deem it prudent to reduce the quantity and lower the quality of his food, and also the time at which it may be necessary to increase and improve it. The acute stage will require the lowest scale of diet, somewhat more judiciously selected than ordinary; and the state of suppuration of the globe, and sloughing of the cornea, will frequently demand, always indeed where the vital powers are much depressed, the use of a nutricious and stimulating diet.

Let me not forget to remind you that although this severe mode of treatment, has been recommended for the cure of that acute form of the disease, which is occasionally prevalent, you will be much more commonly called upon to conduct the management of cases, the symptoms of which are so little severe, that slight attention to the habits and diet of such patients, the administration of a few doses of purging medicine, the use of an astringent lotion, and the application of the unguentum plumbi to the tarsal margins in an evening, will comprehend every measure, which may be required for their cure.

I have as yet said nothing respecting the management of the tinea, the chronic ophthalmia, and that morbid condition of the conjunctiva which sometimes succeed the prolonged existence of acute purulent ophthalmia in its severest form, and I have purposely omitted to speak of these occasional consequences of the disease we are considering, because they will be discussed when we treat of

these maladies as separate diseases. If a case of acute purulent conjunctivitis be seen early, we may expect to remove it altogether, so that the occurrence of tinea, granular conjunctiva, &c., takes place chiefly from neglect or mismanagement. And, no doubt, many relapses and much chronic disease, are induced by the early employment of the stimulating plan of treatment. I never rely on the stability and permanence of a cure which has been so effected.

Prophylactic measures.—When purulent ophthalmia exists among individuals who are assembled and live together in great numbers, as in the army and large schools, it is most desirable to adopt a series of regulations with a view of diminishing, as much as possible, the risk of a further extension of the malady. For this purpose, the diseased should be carefully separated from the healthy. The linen, &c., used by those affected with ophthalmia should be strictly set apart for their sole use; and the usual precautions should be employed with the view of preventing the improper transfer of the contagious fluid. Frequent examinations of the eyes of the whole number should be made, and the slightest indication of inflammation or appearance of discharge should be attended to. Under such circumstances the diet should be lowered, an astringent collyrium should be prescribed, and an active dose of purgative medicine should be administered; and should the disease evince a disposition to advance, more active measures should be adopted without delay. During the prevalence of this malady, exposure of the eyes to a bright sun, to a damp atmosphere (and especially in the evening,) should be rigidly avoided. And it would be desirable to regulate the diet, and recommend a little aperient medicine to be taken occasionally. And it would be most necessary to take care that too many

persons are not crowded in one apartment. This precaution will not only lessen the risk of contagion, but will materially tend to benefit their general health.

SECTION V.—PURULENT OPHTHALMIA OF NEWLY-BORN INFANTS.

Syn. *Ophthalmia neonatorum.—Oculus purulentus.*

I proceed to consider the purulent ophthalmia of newly-born infants, and I select this name from among the many other appellations which have at various times been applied to it, because it informs you that the disease it designates is an inflammatory affection of the eye, producing purulent secretion, and occurring in infants newly-born;—circumstances which characterize many of its most striking phenomena. Mr. Ware,* who, I believe, first gave any approach to a correct description of this disease, termed it the *purulent eye of new-born children.* Like other diseases of the eye, it has received a variety of names in accordance with the diversified views of authors, but I am unwilling to occupy your time with an enumeration of those terms, or with an explanation of the circumstances whence they originated.

Purulent ophthalmia of infants *generally* occurs a few days (about three†) after birth; there is a slight degree of

* *Observations on the Ophthalmia*, &c. &c.: by James Ware, Surgeon.

† This average is deduced from inquiries respecting the period after birth at which the disease appeared in about three hundred cases—in some of these cases it occurred a few hours after birth, in others I have reason to believe it did not appear (though evidently arising *from* contagion applied during the period of parturition) until the infants were a week or nine days old.

redness of the conjunctiva, particularly of its palpebral portion, and also of the tarsal margins, more especially towards the inner and outer canthus: there is also a trifling amount of discharge, which causes the lids to adhere very firmly, if they have been closed for any considerable length of time, and shreds of which may be seen lying upon their mucous surface, when they are everted; and there is, in addition, some little aversion to light.

These symptoms, however, are very slight, and, unless the nurse's attention be directed to their importance from having witnessed similar cases, she will bathe the eyes with some mild fluid, believing this affection of the eyes to be a mere cold, until the disease has really become severe.

When our advice is first requested, the following symptoms (which may be said to constitute the second stage of the disease) are usually present:—there is a good deal of yellow and rather consistent discharge; the conjunctiva is red and tumid; the eye-lids are slightly swoln and increased in vascularity; and the infant is greatly annoyed by light. If this state of things be not interfered with, there is quickly produced an extremely red and swoln state of the conjunctiva—it is changed into a soft red convex body, which, on any attempt to open the lids, or any unusual effort on the part of the child, becomes everted, producing a painful state of ectropium; this appearance of the conjunctiva has been aptly compared to the villous coat of a fœtal stomach, when finely and successfully injected. The discharge is extremely profuse, covering the eye and unpleasantly distending the lids; it is generally of a yellow colour, and a somewhat thick consistence; if the child be jaundiced, it will assume an intensely yellow or a dingy green appearance; there will be also a considerable degree of chemosis, so that, when you attempt to inspect the cornea, you find it almost

obscured by the elevated conjunctiva, and, probably, if you do obtain a sight of it, it presents a very dull appearance, is more or less opaque, and generally so from deposition between its lamellæ; there will be also great intolerance of light, the child will scream and turn away its head whenever the eyes are exposed to the light; the eyelids will be enlarged, and, in some instances, will acquire a purple hue, from the accumulation of venous blood throughout their texture. If the disease be allowed to proceed, the discharge becomes thinner and less profuse, and is occasionally mixed with blood; the cornea assumes a dirty ashy appearance; the tense florid condition of the conjunctiva is exchanged for a slightly red, loose, flabby surface, and the light is less offensive than formerly.

We will now, for a moment, refer to the actual state of the several parts of the eye at this juncture:—the loose, flabby, palish-red state of the conjunctiva, with diminished viscidity and change in the colour of the discharge, point out the subsidence of external inflammation; the sanious, thin, and bloody state of the secretion, shows that the period of active healthy inflammation has gone by, and that there is a gangrenous condition of some part of the external tunics, and the dirty ashy appearance of the cornea assures us that the vitality of its external laminæ, at least, are destroyed.

But it may happen that the inflammation may extend to the internal tunics, and ophthalmitis, followed by suppuration of the eye-ball, may take place. You know the symptoms by which this unfortunate occurrence is distinguished—an aggravation of pain; a sense of tension of the eye-ball; an excessive intolerance of light; great orbital agony; and severe hemicrania;—but your patient cannot describe his feelings, and you must judge whether or not this occurrence has taken place, by the infantile indications

of suffering, the dull state of the cornea, by the severity of the inflammation, and its progress in reference to treatment; for it may happen that the disease may have been too far advanced before it be witnessed by the medical attendant, to be successfully treated, or it may not yield to the means employed for its subduction; and should this be the case, suppuration of the globe, and extensive ulceration or sloughing of the cornea may be expected to occur.

These, then, constitute the various stages into which, for the convenience of description, purulent ophthalmia may be divided:—*the first*, in which there is merely a little redness of the palpebral lining, slight purulent discharge, agglutination of the tarsal margins, after the eye-lids have been for some time closed, and also a trifling aversion to light;—*the second stage*, in which the discharge becomes increased in quantity, and in the intensity of its colour, the whole conjunctiva red, and somewhat swoln, and the aversion to light considerable; *the third stage*, in which there is great chemosis, the conjunctiva being raised into a large red mass, resembling, to use the accurately descriptive language of the late Mr. SAUNDERS, the finely injected villous coat of the fœtal stomach; the discharge is deepened in colour and increased in quantity, so as to re-distend the lids almost as soon as it has been cleared away; the aversion to light is so great that the little patient takes every opportunity of screening the eyes, whenever they are exposed to its influence; and the eye-lids are swoln and red, sometimes even livid, their blood-vessels being frequently much enlarged (particularly the veins), the circulation much impeded, and the cellular texture infiltrated with serous effusion. This state of the disease may or may not be combined with ophthalmitis, and, of course, if it be so combined, there will be, superadded to the symptoms already enumerated, those belong-

ing to inflammation of the deep-seated textures generally. *The fourth and last stage*, to which I shall direct your attention, is that in which the conjunctiva becomes comparatively pale and flabby, the discharge thin, sometimes fœtid, and occasionally sanguineous, and the cornea generally dull, and, at some part of its surface, of that peculiar, dirty, ashy colour, which denotes the absolute loss, or the serious impairment of its vitality.

There is some variation as to the time at which purulent ophthalmia occurs, perhaps, however, three or four days after birth may be stated as the average period at which it takes place, but, like very many diseases arising from the contact of morbid secretions, it varies in this particular, in accordance with the general susceptibility of the patient, or the aptitude of the particular texture to accept the contagion, and other circumstances to be hereafter explained. I have known it take place in eight, ten, or twelve hours after birth, but this is not usual.*

It has been stated that the mildness of its early symptoms, the incapacity of the infant patient to describe his feelings, and the absurd notions of nurses and many poor ignorant parents, who consider this affection as a mere cold (a malady to which they attach scarcely any importance), often prevent us from seeing these cases at their origin, and very frequently they are not presented to our notice until they are so far advanced, that no plan of treat-

* Incertum est vitæ tempus, quo primum in infantibus ophthalmiæ initium observamus. Tertio, quarto, sexto, decimo, decimo quarto vitæ die aut adeo quatuor et sex post partum septimanis originem videbis ejus mali. Quando autem serius exoritur, tribus, quatuor sex et pluribus mensibus præterlapsis, non amplius ad ophthalmiam pertinet neonatorum, sed magis ad ophthalmiam scrophulosam et blepharophthalmiam impetiginosam, si impetigines capitis, crusta lactea, etc, adfuerint, aut ad ullum aliud oculi inflammationum genus. (Benedict, *Op. cit.* § 334.)

ment which may be adopted will prevent the loss of vision. Infants are frequently brought to us after the disease has existed for several weeks, and even produced some of the worst effects by which it is ever succeeded, and their parents evince the most stupid surprise when informed that their children are blind—permanently and irrecoverably blind.

As you would expect both eyes are generally affected, sometimes simultaneously, but more commonly the disease commences in one eye first, and in a few days the other becomes inflamed. You will imagine that a cause, exerting an equal influence upon two structures similarly circumstanced in every particular, would produce an equal effect upon each of them, and you will accordingly find that the conjunctiva of each eye is inflamed at the same time, and in the same degree, when the mucous membrane of both organs is permitted to be equally exposed to the influence of the same morbid vaginal secretion; but you will easily suppose that a great variety of circumstances may exist, which will cause the conjunctiva of one or other eye to be particularly exposed to the more complete and prolonged influence of the essential morbific agent.

We have seen, 1,—that the conjunctiva, first of the palpebræ, and afterwards of the eye-ball, is extremely swoln, and that it has acquired an intensely red and an actively secreting surface; 2,—that the swoln or chemotic part exerts a prejudicial influence upon the cornea, and, by impairing its nutrition, sometimes induces its death, or the deposition of a sort of puro-lymphatic matter between its lamellæ, so that its entire texture acquires a dirty-white appearance; 3,—and that, in addition to these states of disease, the inflammatory action is liable to extend to neighbouring and infrajacent structures, and, in this way, to produce many of the pathological conditions of various

parts of the organ of vision which I now proceed to point out.

Having described the disease in its various stages, I shall proceed to point out its—

Modes of termination.—If the disease be mild in its character, or if it receive early and judicious attention, it will be generally removed without leaving behind any injurious effects; but, if the contrary occur, it is very apt to produce a thickened, vascular and granular state of the conjunctiva, which, in some severe cases, causes ectropium; or, there may remain a lax condition of that membrane, its attachment to the sclerotica may be less intimate than it ought to be, from the previous distension of its connecting cellular membrane, in consequence of which it falls into loose folds; or, it may be raised by serous effusion so as to project slightly around the margin of the cornea, where the œdema is generally most distinctly visible; the conjunctival vessels sometimes continue enlarged, their tonic power is diminished by the distension to which they have been subjected during the period of acute inflammatory action; or, there may remain a state of chronic ophthalmia from the friction of the rough and thickened conjunctiva upon its opposing surface, and upon the cornea.

The membrane covering the outer lamina of the cornea is sometimes thickened and rendered opaque; or what is more frequent, there is lymphatic deposition between the lamellæ of the cornea; and this deposition may be superficial in its situation or otherwise, it may or may not become organized, and it may either be more or less considerable in quantity; if it be small in quantity, superficial in situation, and be not quickly organized, it will be generally removed even without the aid of any local applications; but if, on the contrary, it be considerable in

quantity, if it be more deeply situated, and if it becomes organized, it is rarely entirely removed. However it may *appear* to be large in quantity, because it presents a great extent of surface, but if it be limited to the space between two lamellæ, and consist of a thin layer of deposition, it may eventually be removed, although at first it seem to constitute an irremediable obstacle to vision; indeed these opacities are generally absorbed in whatever part of the cornea they may be situated; they are not removed with a speed proportioned to the extent of surface they occupy, but in a ratio to their thickness and density.

The occurrence of extensive opacity of the cornea, as an effect of purulent ophthalmia of newly-born infants, appears to have led Mr. Farar into a very curious blunder. In a paper read before the *Society for promotiug Medical Knowledge*, under the following title, "An account of a very uncommon blindness in the eyes of newly-born children," he has very singularly pointed out as a congenital disease what I conceive to have been a mere effect of inflammation. He says, "About nine years since, I was desired to see a child, who was about a month old, and apparently blind, having the cornea of both eyes opake, so that not the least of the iris was to be seen.

"My opinion was, that nothing could be done in this case, and that the child would for ever be blind.

"About a month afterwards the parents informed me there was some alteration in the child's eyes, and requested I would examine them again. I then perceived the opacity to be so much lessened, that I could faintly discern the iris. In two months more the child could perceive light, and from that period, the sight progressively increased; and before it was ten months old, the recovery was complete.

"About three years after, another child was born of the

same parents, with exactly the same appearance. Having seen the progress of the first case, I concluded that in this, the event would be nearly the same, and indeed so it happened, in much about the same space of time.

"The manner in which the cornea acquired its transparency, was, in these cases, remarkably curious: the external edge, first growing thin, soon after became clear and transparent; and after this manner the whole surface of the cornea brightened up, the center being the last spot that recovered its transparency." *(Medical Communications*, vol. ii. p. 463.)

The rapid and complete removal of extensive opacities of the cornea, consequent on purulent ophthalmia, is a well-ascertained fact. It appears that such opacities are generally owing to the effusion of puro-lymphatic fluid between the superficial layers of the cornea. The unexpected absorption of these large opacities did not escape the observation of Dr. Vetch. In his interesting *Account of the Ophthalmia*, &c., he makes the following remarks upon this subject:—"The rapidity with which the opacities (of the cornea) disappear, when their removal once begins to take place, is a circumstance not only interesting in the history of the disease, but an important guide to our practice, and from this peculiarity in many cases which were supposed to be perfectly hopeless, the patients recovered such an extent of vision as to make them at least of some use to themselves. One case no less characteristic of this feature of the disease, than interesting from its general import, occurred in a man during his convalescence from ophthalmia. Some pectoral symptoms, to which he had been long subject, suddenly assumed the appearance of pulmonary consumption, which proceeded in a rapid manner towards its last stage; five days previous to his death he was seized with a violent aggravation of the hectic fever, and the other symptoms, and his death was

hourly expected: at this time, to the surprise of all his attendants, the opacities, by which the vision in both eyes had been long obstructed, disappeared with an amazing rapidity, and a short time before his death, his vision became nearly as distinct as ever."

If the inflammatory deposit be large in quantity and unorganized, its pressure may cause the absorption of the neighbouring corneal lamellæ, and thus produce an ulcerated cavity, containing such deposition, which may burst externally or internally, when it will be distinguished by the circumstances which characterise each of these forms of disease. The extent to which deposition may take place between the corneal lamellæ, without producing ulceration or sloughing of that part, is really astonishing. But it must be remembered that the texture of the cornea is less compact, and that its lamellæ are more moveable upon each other in early life; so that a mass of pus or lymph, or a quantity of puro-lymphatic matter, which, when situated between the corneal lamellæ, would insure their destruction in the adult, often produces little or no permanently injurious effect upon the same parts in a child. Hence it happens, that in some bad cases of purulent ophthalmia, where the spaces between the various layers of the cornea are filled with opaque depositions, until the part is rendered prominent and appears ready to burst, these morbid depositions will, if the inflammation and swelling are speedily subdued, be entirely removed, without leaving behind any impairment of transparency or any morbid effect whatever.

Ulceration of the cornea is another not infrequent consequence of infantile purulent ophthalmia, and it may happen in a great variety of ways. An ulcer of the cornea may occur from the direct ulcerative absorption to which the morbid state of the eye and particularly of the conjunctiva, has given rise, and if this process commence

within its layers it may be followed by secretion from the ulcerated surface, forming a pustule, or an abscess within the cornea; or, it may take place from the pressure of the deposition between its lamellæ. You will distinguish the primitive from the consecutive ulcer of the cornea, and you will be aware that it (the ulcer) may either be situated externally as a minute cup or depression; within its substance, giving rise either to onyx, the formation of a pustule or an abscess; or internally, having, previously discharged the fluids secreted from its surface into the anterior chamber, when the serous lining of the cornea gave way, or if otherwise, commencing on the neural surface of the cornea and extending through its external lamellæ. The ulceration may also exist throughout the whole of its layers, and there may be an external aperture communicating with the anterior chamber.

Gangrene or mortification of the cornea is also another consequence of purulent ophthalmia; this process may occupy the whole or merely a part of its circle, its superficial lamellæ or its whole series of laminæ; it is caused either by its participation in the inflammatory action of neighbouring parts, or by direct interruption to its circulation; its low grade of organization prevents it from successfully resisting much excitement. We shall speak of these things more particularly when considering the diseases of the cornea. *Suppuration of the globe* is also another occasional consequence of purulent ophthalmia.*

The last morbid change of the cornea to which I shall call your especial attention, in connexion with our present subject, is *staphyloma*. When from any cause the outer

* This has been denied by Mr. Saunders, on what I consider to be very insufficient grounds. He says, "I am equally certain too, that the eye is not destroyed by suppuration, as some have supposed." See his remarks *on inflammation of the conjunctiva in infants*, page 42.

tunics of the eye have become so far weakened, that they can no longer oppose that resistance to the pressure of the contents of the globe, which is required to prevent their increase, they yield, and from an external tumour of a certain figure, colour, and size, and occasion not merely great deformity, but in some cases where the tumour is very partial and prominent, they cause so much irritation and uneasiness as to justify the performance of an operation for its removal; this yielding, which constitutes staphyloma, generally occurs in the cornea, after its texture has been weakened and attenuated by ulceration and superficial gangrene. Enormous staphylomatous enlargements of the eye-ball are sometimes consequent on this *ophthalmia neonatorum.* I have once or twice seen *hydrophthalmia* follow this purulent inflammation of the eye—that is, an enlargement of the globe of the eye, from an increase of its fluid contents—but this is by no means a frequent occurrence.*

There are many changes in the state and situation of the iris referable to the inflammation of which we are now speaking; for instance, it may become closed, its fibres

* Dr. Ammon has published an interesting paper on the *Pathological state of the eye-ball and its coats during the course of the ophthalmia of new-born children*, and in the course of his remarks he has made the following statement in reference to the condition of the cornea. "If we examine very closely the back part of the cornea, the different situations of its lamellæ, we shall find several deviations from the natural state. A constant appearance which we observed, was a looseness of the lamellæ of the cornea, so that they could be easily separated from one another. The cornea was very frequently tinged with a red colour, without its transparency being destroyed, which disappeared only after long maceration. It deserves to be remarked here, that the red colour of the cornea was only to be perceived when this coat had suffered in its structure, as by the death of its lamellæ, effusions of pus, ulcers, &c.. When the red colour of the cornea was present, we always found blood-vessels, or effusion of lymph, or pus, in its lamellæ. In cases where the cornea was perforated, the form of the opening was always round, and this was so smooth and clean, as if it had been made with a sharp knife."

may meet in what was formerly the centre of the pupil, and thus obliterate that aperture; or its pupillary margin may acquire an altered form, it may become angular and lose its circular figure; it may contract adhesions to the capsule of the lens (synechia posterior); or it may become attached throughout a variable extent of its surface, to an ulcer of the cornea, (synechia anterior); or, it may become prolapsed,—it may be projected by the pressure from behind, through an ulcer in the cornea. These are the ordinary effects of that degree of infantile purulent ophthalmia which leads to some morbid product, and they are merely referred to now in this very cursory manner, because they will, for the most part, be more particularly investigated when considering them as distinct diseases.

Causes.—It is a point of some consequence to ascertain the cause of every disease, inasmuch as such a discovery will not only have a tendency to assist our means of cure, but, in some instances, will even enable us to prevent the occurrence of the disease where it would otherwise very probably have taken place. It rarely happens, however, that any serious affection arises from *one* cause merely, unassisted by any circumstances favourable to the efficient agency of such cause; these remarks appear to have especial reference to the disease we are now considering, for you will generally find, that although the mothers of children who are affected with purulent ophthalmia soon after birth, have some morbid vaginal discharge, yet there are some defects in the children themselves, or in the management of them, which appear to have no trifling share in predisposing them to become so affected, or in aggravating the symptoms when the disease takes place.

In the year 1807, Mr. Gibson, of Manchester, distinctly stated that fluor albus was a very frequent cause of infantile purulent ophthalmia, and pointed out the propriety of

adopting certain precautionary measures, during and subsequent to parturition, in those instances in which leucorrhœa, on the part of the parent, was suspected. Mr. Simmons strongly opposed this opinion, and, in the fifth volume of the *Edin. Med. and Surg. Journal*, he has stated, at considerable length and with great ingenuity, the grounds of his objections. He believed it to be owing to a "peculiar condition of the atmosphere." Mr. Hill conceived that the sudden exposure of the child's eyes to the influence of light and heat immediately after birth, afforded a sufficient explanation of its occurrence at the early period at which it is known to take place. Helling supposes that, in many cases, it arises from the sudden impression of a very strong light. Beer imagined that the disease was owing to the bad and contaminated air surrounding the little patients in whom it occurred. Some writers have intimated that infantile purulent ophthalmia is only *generally* excited by the contact of leucorrhœal discharge (Bateman, Gibson, Wishart,) others again are inclined to think that it arises *solely* from the contact of leucorrhœal matter (Cooper, Ankers,) but I think it must be admitted, that it may be produced from various morbid vaginal secretions, but that it is more frequently occasioned by gonorrhœal and leucorrhœal discharge. Such, I perceive, is the opinion of Dupuytren.*

It does not appear that leucorrhœal discharge, when

* Benedict has very fully considered the causes of the *ophthalmia neonatorum*. He says, it may arise from exposure to cold soon after birth, and from the influence of light, and intimates that friends are apt to expose the eyes of an infant "ad candelæ lucem, ut ex ejus facie utrius parentum suorum similitudinem præ se ferat intelligant." He further remarks—"Denique etiam ab infectione contagii franco-gallici in transitu capitis per vaginam facto ophthalmiam neonatorum subortam vidimus, in infantibus, quorum matres albo fluore syphilitico laborabant. Sapius etiam fluor albus in matre non syphilitica, seu benignus, uti vocatur, ophthalmiam in recente nato excitare valebit." (*Liber decimus quintus*, § 330.)

applied to mucous membranes, commonly produces purulent inflammation of those surfaces, unless the application of such matter be very complete and prolonged, and various circumstances assisting the operation of the infecting agent be present; but, although this does not frequently take place, it does sometimes occur. It more usually happens that a discharge of a pale tenacious matter arises, which does not continue long, and is readily removed by the use of a common astringent remedy, locally applied. Why, then, does purulent ophthalmia so generally result from the contact of leucorrhœal discharge with the surface of the conjunctive membrane? I apprehend that the changed condition of the infant, the exposure of the eye for the first time to the influence of the atmosphere, and of light, and frequently also of heat, predispose the part to accept the puriform inflammation—assist and modify, as I have stated, the operation of the infecting agent. When the eye of an infant newly-born is exposed to the ordinary causes of ophthalmia, and when, in consequence of such exposure, inflammation of the eye takes place, such inflammation is not often attended by purulent discharge. Undoubtedly infants suffer from ordinary ophthalmia arising from the common causes of that variety of inflammation.

It results, from my view of the subject, *first*, that common inflammation of the conjunctiva in newly-born infants may occur from the application of the ordinary causes of that malady in adults; *secondly*, that purulent ophthalmia may, under the circumstances already pointed out, proceed from the contact of leucorrhœal discharge applied during the period of parturition; and *thirdly*, that the worst cases of this malady we are called upon to manage are occasioned by the application, *not* of *leucorrhœal*, but of *gonorrhœal* discharge.

The appearance of the disease a few days after birth would in itself lead you to suspect that the infant became exposed to an influence of contagion, during its passage through the vagina, adequate to produce the malady; and the nature of the disease, combined with the profuseness and the quality of the discharge with which it is attended, would augment your conviction of the accuracy of that opinion. There is no other agent connected with the peculiar circumstances of that period of infantile existence, which would exert so partial (I speak in reference to the numbers attacked) an influence; for instance, all infants are subject to the same change of residence, exposure to light, and to cold, and so on, although only a small portion, it is presumed, are destined to pass, in their exit from the uterus, through a canal covered with morbid secretions. However, this is a subject you will carefully examine for yourselves; but, let me advise you, until you have satisfied your minds upon the question, to guard the infant as much as possible from the hazard of contagion in those cases in which you have reason to suspect the parent is affected with morbid vaginal discharge, not only by defending the eyes of the infant during the birth, but by directing that they be most carefully cleansed with warm milk and water immediately afterwards, and also, by requesting the nurse or some female attendant to give you the earliest notice of any appearance of redness or inflammation of those parts. By the adoption of these means you will, I am persuaded, in the majority of instances, prevent its occurrence, and in those cases in which you are not so fortunate as entirely to obviate its occurrence, you will render it comparatively mild, by preventing the contagious matter from exerting so complete and prolonged an influence as it otherwise would do; and, by obtaining an opportunity of seeing the disease at its onset,

you will meet it with success, by meeting it with promptitude.

I shall however presume that my opinion as to the common exciting cause of the disease is correct; an attentive examination of this department of my subject has convinced me that such is the fact, of which many cases in direct, and, as I think, unequivocal, proof, might be adduced, if I did not apprehend that such a proceeding would be quite superfluous. But in stating to you my conviction that this disease is produced by the contact of morbid vaginal secretions, I ought to apprise you that the accuracy of this opinion is not universally admitted. Mr. Saunders, for instance, considered the inflammation to be of an erysipelatous character, and has not at all alluded to the agency of contagion, in any part of his remarks, *on inflammation of the conjunctiva in infants*; he says, "I hold myself warranted in considering this ophthalmia (purulent) of infants, to be an erysipelatous inflammation of the conjunctiva." (P. 43.)

Now, morbid vaginal secretions vary in their nature; some, as you know, are gonorrhœal, some are gleety, and very many others are rather indefinitely called, leucorrhœal; in short, they are very various, and you would perhaps expect that if the opinion I have been endeavouring to maintain were correct, there would be a particular condition of the eye, leading to a particular quality of discharge, and distinctly referrible to each particular kind of vaginal secretion. If indeed this could be accurately accomplished in all cases, it would constitute a perfection of knowledge with regard to this disease which does not exist in other departments of pathology. Although there is some slight difference in the colour, consistence, and quantity of the discharge in these cases, there does not exist any variation in these particulars, which the constitutional condition

of the infant, the severity of the inflammation, and other similar circumstances will not, in most instances, satisfactorily explain; besides it must be remembered that the mucous membrane of the eye does not produce a great variety of secretions, although it readily gives rise to puriform secretion from many causes of a dissimilar nature; the application of cold, of the discharge from an eye affected with common purulent or gonorrhœal ophthalmia, and sometimes even local injury, when exciting acute conjunctivitis, will each of them occasionally produce an inflammation of the conjunctiva attended with purulent secretion; if then, causes of so dissimilar a nature, may give rise to effects so identical in their characters, that they cannot be discriminated from each other, it would be absurd to expect that every slight variety of vaginal secretion which may be merely distinguished from its other forms by some trivial shade of difference, should, when applied to the mucous surface of the eye of an infant, produce an inflammation attended with a secretion possessing characters which accurately correspond with those of the discharge whence they originated. Let me not be misunderstood;—there is a difference in the qualities of the secretion proceeding from the conjunctiva of infants affected with true purulent ophthalmia, but not such a difference as will always enable us to refer it with certainty and exactitude to any particular modification or type of vaginal secretion. We cannot, for instance, say with unvarying accuracy of one form of infantile purulent ophthalmia, judging from the qualities of the discharge alone, that it arises from the existence of gleet, of another, that it proceeds from gonorrhœa, of a third, that it is a consequence of leucorrhœa, &c. on the part of the parent. When the disease of the eye appears very soon after the infant's birth, and is characterized by an unusual rapidity of progress,

by very great tumefaction of the palpebræ, and by the secretion of a large quantity of thick straw-coloured matter, there is little doubt but that the mother is affected with gonorrhœa, and this fact, I have, under these circumstances, sometimes been able to ascertain by the patient's own confession, elicited under an impression that the disclosure of this *delicate secret* would assist me in preserving the infant's eye-sight.

Mr. Morrison after having described the symptoms and related the history of a case of infantile purulent ophthalmia, and explained its origin from contagion contracted during birth, says, "to confirm the opinion I early entertained of the real nature of this complaint, I was led to adopt a very bold experiment: a little matter was applied, that issued from the eyes of Mrs. N's child, to an abraded surface on the back of the hand of a young surgeon; the result was, a genuine venereal ulcer was produced, and to subdue which, the most steady administration of mercury became necessary. The case was seen by a very discerning professional gentleman, who perfectly coincided with me in opinion, that it was venereal." (*Med. and Phys. Journal,* vol. xx. p. 60.)

Infantile purulent ophthalmia, more frequently attacks the progeny of the poor, than the offspring of those in better circumstances, it is more common in premature children and twins, and is most obnoxious to those who are weak and delicate in constitution; it is also observed to be very prevalent in foundling institutions, those I mean, that receive infants deserted by their parents immediately after birth; whence I infer, that delicacy of constitution, want of cleanliness, defective nursing, and a vitiated atmosphere, are powerfully predisposing causes.

Mr. Ware has supposed that the purulent ophthalmia of infants may arise from cold, and has observed it to be

connected with a scrofulous constitution, but it occurs at that age when the symptoms of scrofula are not rendered evident in other situations; it occurs also in the offspring of parents, whose former children have had no similar disease, and who are not, except by a forced and constrained application of the term, the subjects of scrofula; it also takes place in the summer as well as in the winter, and, in the latter season, where there has been no unusual or improper exposure of the infant to the influence of cold. Neither of Mr. Ware's observations, with regard to the cause of infantile purulent ophthalmia, have been verified by the experience of succeeding writers.

When Mr. Ware remarked that he had found infantile purulent ophthalmia connected with scrofula, he must have referred to that form of catarrhal or purulent conjunctivitis which sometimes prevails extensively among the children of the poor, and which is usually most severe in the delicate and scrofulous; or he must have inferred the fact, from a knowledge of the patient's constitution, or a guess at that of the child; because, as you well know, scrofulous diseases in a state of development are rarely, if ever, born with children, but become gradually evolved afterwards; and the disease in question is quite dissimilar to strumous affections of the eye generally, and occurs, in many instances, in those who are not merely in other respects quite healthy but who are never afterwards the subjects of scrofulous disease; indeed, the local character of the malady at its onset is quite unquestionable; it sometimes attacks the healthiest children, it is not, unless extremely severe, attended with constitutional derangement, and it may be cured solely by local remedies. Besides, the discharge is, for the most part, of a healthy purulent, and not of a curdly character.

If we are to admit that cold is the cause of this affection,

it ought first to be proved that it occurs much more commonly in winter than in summer, in cold than in warm climates, and also, that whenever it has occurred, its origin may be distinctly traced to some undue exposure; but I fancy all these things remain to be proved.

Prognosis.—Of course the character of your prognosis will be chiefly determined by the state of the eye at the time you are first requested to see it. If the disease be in its incipient stage, your treatment will be almost invariably successful, so that you may generally pronounce, with more than ordinary confidence, a most favourable opinion, when you have an opportunity of seeing the case at an early period and of conducting its management without interruption or interference. No disease, to which the eye is subject, which assumes, in the first instance, so formidable an aspect, is, in my opinion, so readily controlled by treatment. But if it has been going on for some time, if the discharge be very abundant and of a deep yellow colour, and if, at the same time, the swelling of the lids and chemosis be considerable, your prognosis would be doubtful, from a knowledge of the unfortunate termination of the disease generally in such cases; and you would deem it the more necessary to be guarded in your prognosis, inasmuch as you cannot in this state obtain, in many instances, a satisfactory view of the cornea. Should the disease have been allowed to continue without any treatment, or what is perhaps worse, without the employment of judicious treatment, should the discharge have become thin and sanious, the swelling have subsided, and the pain declined, and should the cornea have assumed a dull ashy appearance, or be extensively ulcerated, or the seat of much interlamellar deposition, your opinion of the termination of the case would be still more unfavourable; you would not, however, say positively that no sight would be saved, for even when ulceration or gangrene have

commenced, their progress have been sometimes arrested by well directed treatment, and, in some instances, very large opacities have beeu gradually removed, so that the patient who was originally quite blind from this cause, has been, in the course of time, able to see tolerably well. Bearing in mind these facts, and knowing that your reputation might suffer in the estimation of your patient, if the event should belie your positively expressed opinion, it would be advisable to be guardedly cautious in your mode of communicating your apprehensions of the result. A collapsed state of the eye-ball, decided staphyloma, or a disorganized condition of the cornea, would justify you in asserting the inevitability of permanent blindness, by which I mean, in the present instance, the destruction of all useful vision. There are some conditions of the eye resulting from the disease in question, which, although they insure temporary blindness, may, in the course of time, be either partially or wholly removed; among these obstacles to vision, the closed pupil and opaque cornea are the most frequent.

Sometimes an infant affected with purulent ophthalmia is jaundiced; in such case the skin and the secretion from the eye will be of a yellow or a greenish tint; these cases are generally more unfavourable than others, in which this malady is absent; certainly such cases are less manageable, more tedious in duration, and more unfavourable in their termination, *cœteris paribus*, than those in which no such mischief exists.

Treatment.—What is the precise pathological condition of the conjunctive membrane at an early stage of the disease? Its vascularity is increased, its size is augmented, and there is generally a pretty copious secretion of pus from its surface; hence it is clear that the infecting agent has taken effect, and that the inflammation has

given rise to puriform discharge, so that the object of our remedies is simply the removal of inflammation. The disease is, then, purely inflammatory, and the time for the adoption of *prophylactic* measures has passed by.

There are some of these cases of purulent ophthalmia so slight that the application of an astringent lotion, and the administration of a small quantity of magnesia, will be quite sufficient for their cure; but, generally speaking, treatment of a more active nature will be required; much, however, will depend on the stage of the disease at the time it first becomes an object of medical treatment. If you are called to a case of this kind at an early period, you will find the employment of a solution of alum, with a little magnesia, so as slightly to relax the bowels, sufficient for the cure. You will direct the nurse to procure a well-made ivory or pewter syringe, (the point must not be very sharp,) and to inject every half hour, or more frequently, if necessary, a little warm milk and water beneath the lids, taking care to place the extremity of the syringe at the outer angle of the eye, and to pass it for a short distance almost parallel with the surface of that organ; not very obliquely, as though it were intended to pierce the eye-ball, for, in that case, either the eye will be bruised, or the point of the syringe closed by the conjunctiva. There is another advantage connected with thus directing the point of the syringe—the fluid it emits is equally diffused over a great extent of surface, its force is not concentrated in, and directed to, one point, as would occur if its extremity were placed more obliquely in reference to the anterior surface of the eye-ball. Having thus cleared away the abundant secretion, and as a necessary consequence, relieved the lids from that tension, and the eye-ball from that pressure, they would otherwise experience, you will proceed to inject a weak solution of the sulphate of zinc,

or, what is perhaps better, a little alum lotion, (about three or four grains of alum dissolved in an ounce of distilled water,) every second hour, always premising the ablution of the eye as just directed, in order to insure the efficient action of the more important application; and it would materially contribute to the infant's comfort if you would direct the nurse to apply a little fresh butter or sweet oil, or a little of the ung. plumbi or the spermaceti ointment, along the tarsal margins whenever the child is about to sleep, to prevent the agglutination of the lids which is so apt to take place when the discharge is permitted to be undisturbed for a longer time than usual. The adoption of this precaution will render unnecessary that tedious bathing of the palpebræ, or that forcible separation of the lids, which will otherwise be required, as well as prevent the occurrence of those evil consequences to the eye and to the lids, so generally resulting from an accumulation of purulent secretion beneath them. You will further direct the administration of a dose of magnesia, or, if the child be jaundiced, a few grains of the hydrargyrus cum creta, to preserve the intestinal canal in a slightly relaxed and in a healthy state. You would remove the discharge, not to prevent any ulceration or injury to the cornea its acrimony had a tendency to produce, as mentioned by Mr. Ware, but simply to relieve the globe from the pressure, and the lids from the distension, its accumulation occasions.

The disease may be so severe, the swelling of the lids and chemosis so considerable, and the discharge so profuse and indicative of so acute a degree of inflammation, that you would not rest content with this simple treatment, but at once direct the application of a leech either to the root of the nose, or, according to the degree of existing symptoms and the kind of patient you have to treat, one upon the upper lid of each eye; and, knowing the extremely

vascular state of the lids under such circumstances, you would be careful to direct the closure of the bleeding orifice immediately on the falling off of the leech or leeches; and if necessary, from a pallid state of the infant, or any decided symptoms of feebleness from loss of blood, you would not omit to charge the nurse to remove it or them before they voluntarily quit their hold.

If the eye-lids are much swoln, and of a dark colour from an obstructed circulation, if any vessel be particularly large, distinct, and prominent, you may open it with a lancet, and encourage the bleeding by fomenting the part with warm water, and you may sometimes, in this way, obtain all the blood it may be desirable to remove, without producing that swelling and ecchymosis which so frequently follow the application of leeches.

However, you may not see the case until the last set of symptoms has commenced, when the cornea has become extensively ulcerated or gangrened, the chemosis diminished, and the conjunctiva loose, flabby, and comparatively pale; for such a state of things it would be right to employ a solution of the nitrate of silver; let two or more grains of the nitrate of silver be dissolved in an ounce of distilled water, and let a small quantity of this solution be dropped into each eye two or three times a day, and let the eyes be frequently bathed with the zinc lotion; in this way you may arrest the progress of ulceration, or limit the extent of gangrene, and if you cannot restore unimpaired vision, you may materially lessen the amount of mischief which would otherwise occur, and most probably prevent altogether, and certainly limit the magnitude of, staphyloma.

Should suppuration of the eye-ball take place, its treatment would be conducted according to the rules previously mentioned for the management of that severe form of disease:—do not permit the little patient to become ex-

hausted with suffering from a neglect to puncture the cornea at a proper period, and discharge the contents of the eye-ball.

I cannot dismiss this subject without alluding to the harsh applications so strongly recommended by Dr. Vetch—I particularly refer to the local employment of the undiluted liquor plumbi acetatis—because I am anxious to prevent those of you, who, from reading his book might be disposed to place an undue dependence on that remedy, from employing it until, at least, more certain and tried measures have been adopted; and this caution I believe to be more especially necessary, because there is, at the present time, an extraordinary partiality for the *early* employment of stimulants in acute inflammation of the eye; we will not undervalue stimulants, but we would wish them to be used at a proper time; let the acute stage pass by, let the secretion become diminished, and the tense florid state of the conjunctiva be exchanged for a comparatively pale flabby appearance of that membrane, and then either the undiluted liquor plumbi acetatis, or the strong nitrate of silver ointment, may be advantageously employed. Mr. Ware was extremely partial to the aqua camphorata of Bates's dispensary, in these cases, but, a knowledge of its composition does not unfold those superlative qualities, his eulogistic recommendation would lead you to expect. The *ung. argenti nitratis* advised by Mr. Guthrie is an excellent means of quickening the cure after the acute symptoms have been diminished by bleeding, the administration of laxatives, and the application of cooling and astringent lotions; but notwithstanding the strong recommendation this remedy has received from the excellent surgeon to whom I have referred, I cannot coincide with him in admitting the propriety of its use at the *earliest* stage of the purulent ophthalmia of infants.

I have thus endeavoured to present you with an account of that treatment for the cure of infantile purulent ophthalmia, which, under my own observation, has been most beneficial, after having witnessed and adopted many of those modifications of various methods of treatment, which the practice of others has led them to recommend; and have thus included, *first*, the treatment of the acute stage; *secondly*, of the chronic or secondary stage; *thirdly*, the management of slight cases; and *lastly*, the plan to be pursued in those instances where the acute symptoms have declined, leaving behind serious injury to the cornea or other important part of the eye; and also directions for the management of (not an unusual circumstance) those infants in whom the disease of the eye is combined with some constitutional mischief, such as jaundice, &c.

It may be mentioned that nearly every writer of character who has directed his attention to this disease, has very properly pointed out the importance of local applications, and although the applications so advised differ, for the most part, with respect to the precise character of the formula, they are frequently found to operate—to produce their beneficial influence—pretty much upon the same principle;—thus, M. Sanson advises the solution of the nitrate of silver; Schmidt, a lotion composed of the sulphate of zinc and the subacetate of lead; Mr. Guthrie recommends the nitrate of silver to be used in the form of an ointment; the late Mr. Saunders and Mr. Wishart and also Dr. Blundell preferred a strong solution of the sulphate of zinc; Vetch, the undiluted liquor plumbi acetatis; Scarpa and Ware employed the aqua camphorata; Benedict prescribed the use of liquid laudanum; and Mr. Mackenzie relies more particularly upon a strong solution of the sulphate of copper applied to the diseased part by means of a camel hair

pencil; whilst Dr. Armstrong preferred to employ the blue-stone in substance.

The insufflation of calomel has been particularly successful in the practice of M. Dupuytren.*

SECTION VI.—GONORRHŒAL OPHTHALMIA.

Syn. *Gonorrhœal conjunctivitis.*—*Ophthalmia gonorrhoica vera.* Beer.—*Ophthalmia venerea metastatica.* Sauvages.—*Gonorrhœa oculi.* Benedict.

The last form of conjunctival inflammation, attended with purulent secretion, to which I shall call your attention, is gonorrhœal ophthalmia; a disease which has been recently very elaborately investigated by Mr. Lawrence, in his *Treatise on the venereal diseases of the Eye.* Fortunately this malady is of rare occurrence, although it takes place sufficiently often to enable all of us to witness

* The following case has just occurred under my own immediate observation, and it is the only one of the kind I have witnessed during the whole course of my practice. A woman of profligate habits was affected with gonorrhœa at the time of her confinement. Thirty-six hours after the birth of the child its right eye became inflamed, the eye-lids were enlarged and discoloured, and there was a slight secretion of pus. On the following day the left eye became a little weak, and in the course of twelve hours afterwards a condition of well-marked purulent ophthalmia was present. This child ultimately recovered, without any injury to vision; but just as the case was beginning to amend, the mother began to complain of pain in the left eye, but I was not told of the circumstance until the following day, when on calling upon the patient, and examining the state of the organ, I perceived that she was suffering from acute purulent ophthalmia, in a pretty completely developed state. In spite of the adoption of every degree of depleting treatment which the circumstances of her case justified, vision was seriously impaired by opacity and partial staphyloma of the cornea consequent on ulceration of that tunic. This person was not aware that she had touched her eye with the matter proceeding from the conjunctiva of her infant; but I am not acquainted with any more probable cause of the disease from which she so severely suffered.

and regret its severity. You will imagine that it is a singularly rare affection, when I state that the well-informed Dr. Frick, who lately undertook to write a book, and to lecture upon diseases of the eye, confesses that he never saw it, although, on the authority of others, he admits its existence.

Gonorrhœal ophthalmia is an affection of an extremely violent nature, rapid in its progress, and very generally destructive in its consequences, almost always seriously impairing, and not infrequently destroying, vision. As its name implies, it bears some relation to gonorrhœa, and it will be our object to explain, as far as we can do so, the kind and degree of connexion subsisting between the puriform inflammation of the urethra and that of the eye.

Gonorrhœal ophthalmia very rarely attacks females; I have only seen it take place in females in three or four instances and Mr. Lawrence remarks that he has never, on any occasion, observed it in the adult female; he says, "one circumstance, almost irreconcileable to the idea of the application of gonorrhœal matter being the cause of this affection, is, that the inflammation of the eye called gonorrhœal, is confined to males, and never occurs in females." Boyer says the disease is extremely rare in women, and the same statement is made by Swediaur, but Baron Dupuytren distinctly denies that this is the case in the Hôtel Dieu. It may also be noticed, that it seldom affects both eyes at the same time; occasionally the second eye becomes inflamed in the course of four or five days after the first, less frequently it becomes affected as its fellow is more nearly approaching recovery. These circumstances will be particularly considered when we investigate the causes of this complaint.

Symptoms.—The earliest symptoms of gonorrhœal ophthalmia are, increased vascularity of the conjunctiva, with

slight intolerance of light, and augmented lachrymal secretion; the redness does not commence at any one point of the conjunctiva in particular, but appears to affect simultaneously its whole, or nearly its whole, surface; there is also that sensation of sand beneath the lids which is common to almost every form of acute conjunctival inflammation, and which sensation has been said to depend mainly on the prominence and sudden distension of its vessels, by which the smoothness of those surfaces which move upon each other is destroyed; this sensation is more severe in this form of inflammation and the acute purulent ophthalmia previously mentioned, than in any other. The preceding symptoms are very rapidly aggravated; the conjunctiva soon becomes extremely red, and raised from its connexion with the lids and the sclerotica, so that it projects between the palpebræ as a convex vascular mass, and nearly conceals and overlaps the cornea; there is profuse purulent secretion, great intolerance of light, and an extreme sense of tension in the eye-ball; the lids become swoln and of a dark red colour; the upper lid frequently hangs down upon the cheek, and is so much prolonged and thickened by congestion of its vessels and by effusion into its loose cellular texture, that it cannot be raised by the natural efforts; there is also severe pain of the face and orbit, and hemicrania of the side affected; the constitution is also greatly disturbed; there is much irritative fever, with a loaded tongue and suppressed secretions. If you now carefully examine the central portion of the cornea, which the chemosis, at this stage, has not covered, the pupil will be found to be contracted, and the aqueous humor turbid. This turbid *appearance* of the aqueous humor is not always produced by any change in the qualities of that secretion, but generally depends on the tense and inflammatory condition of the globe; for, if you will lessen its

fulness by evacuating the aqueous humor, as advised by Mr. Wardrop, (*Medico-Chirurgical Transactions*, vol. iv. p. 142, and *Edin. Med. and Surg. Journal*, vol. iii. p. 6,) you will find the turbid appearance of the eye removed, and the clearness of its chambers completely restored.

Now these symptoms establish themselves with extraordinary rapidity, and such is the violent character of the disease, that even if it falls under your notice as soon as the patient discovers any uneasiness in the organ, you are not able to prevent the establishment of acute inflammation, with, very probably, serious injury to vision.

It has been stated that the lids, particularly the upper one, are extremely elongated and enlarged, and that they are in a state of great vascular congestion, and you may inquire, what necessary connexion has such a state of things with the gonorrhœal inflammation of the conjunctiva? The inflammation of the conjunctiva extends to the cellular membrane, connecting it to the neighbouring parts; this inflammation terminates in effusion, and its cells receive in addition the increased exhalation from the posterior surface of the inflamed conjunctiva, the distended vessels of that surface relieving themselves in the same way as do those of its opposite and external surface—by increased secretion; and, as a consequence of this state of things, the palpebræ become tumid and enlarged. But not only is the cellular membrane intermediate to the cuticular and mucous surface of the lid distended and enlarged by serous and lymphatic deposition, but the lid itself becomes increased in size from the augmented magnitude of its vessels, and particularly of its veins; this congested state of the circulation, and consequent distension of vessels, is owing, first, to the compression produced by the effusion beneath, and is afterwards much assisted by the inflamed state of the eye-lid. This

leads me to consider the kind of effusion upon which this extreme and rapidly formed chemosis depends. You would imagine that an effusion produced by inflammation of that surface of a mucous membrane, by which it is connected with the cellular tissue beneath or around it, and on the inflammation of the cellular tissue itself, would, if rapidly formed, chiefly consist of serum, in whatever state of constitution it might occur; and such, indeed, is the case, for, although the chemosis attendant on gonorrhœal ophthalmia does not assume that pale-red appearance, and acquire that loose and rather flabby state which has been mentioned as one of the common characters of slight œdematous chemosis, yet, if it be freely scarified, it will yield an abundance of serous fluid, and become materially diminished in volume. However, it must not be forgotten, that a state of inflammation so acute as that of gonorrhœal conjunctivitis is attended with great enlargement of vessels, particularly in a structure so soft, and so little compact, as that of the conjunctiva, and that this local plethora is one cause of the augmented volume of that part, under the circumstances I am now presuming to exist. And I may here mention that this swoln or chemotic state of the conjunctiva was considered by Astruc, Richter, Beer, Swediaur, Chandler, and Wenzel, to arise from the effusion of gonorrhœal matter beneath it. They imagined that gonorrhæal matter was effused beneath the conjunctiva, and projected that membrane forwards, and that the effusion into the anterior chamber, sometimes noticed in severe cases, and particularly at the latter stage of this affection, consisted also of the same gonorrhœal fluid.

Hitherto I have merely alluded to the symptoms of the commencement and the establishment of gonorrhœal ophthalmia, I have told you that the hemicrania and tension

of the eye-ball were most distressing and that it may even be necessary to tap the eye, to alleviate the horrible distress of which your patients will occasionally complain. There is yet a third or last stage of the disease to be mentioned. If the cornea do not ulcerate and the contents of the globe be not partially evacuated, the symptoms would appear to wear themselves out; the morbid action seems to have a determinate extent, and to subside spontaneously after a certain period of continuance, even though it may previously have been uninfluenced by treatment, or not treated at all. The transparency of the cornea is then destroyed, sooner or later it ulcerates or sloughs; the globe is filled with pus; its natural contents are changed in character or partially removed; the conjunctiva becomes comparatively pale and flabby; the discharge thin, gleety, and mixed (according to the state of the cornea and other circumstances) with a great variety of secretions, which are sometimes of a bloody, and in other instances of a fœtid and ichorous character; the palpebræ diminish in volume, the pain either ceases altogether, or becomes materially lessened; and the intolerance of light is no longer a source of complaint, unless indeed, the opposite organ becomes irritable and inflamed, then of course, there may or may not be intolerance of light, as the organ last attacked may be more or less irritable. Such are the symptoms which indicate the subsidence of inflammatory action, when the case terminates unfavourably for vision; but if, on the contrary, vision be not much injured, there will be a declension of all severe symptoms, leaving the cornea clear or nearly so; the discharge lessened, and increased in its consistence, and in its glutinous properties, but not mixed with bloody or fœtid secretions; and the internal structure of the eye not materially changed. Such are the three stages of gonorhœal ophthalmia; namely, the symptoms of

its accession, its establishment, and its decline; the symptoms of its subsidence being distinguished either as they indicate the total loss, or merely slight impairment of vison.

I have said that the discharge is very abundant, so extremely abundant, that unless it be frequently removed it will flow freely down the cheeks, and it may be remarked, that if it be received upon a linen handkerchief, it stains it, in the same way, as does the discharge from the gonorrhœal inflammation of the urethra; indeed its characters are, in every respect so precisely similar, that I do not think any one can distinguish one from the other, or point out any circumstance as to consistence or colour by which they may be referred to their respective sources. The discharge varies in the different stages of the disease; it is at first thin and pale, in consequence of its admixture with the increased mucous and lachrymal secretions, and also on account of the slightness of the inflammatory action; it is afterwards viscid, yellow, and profuse in quantity; and where the disease terminates unfavourably for vision, it eventually becomes thin, gleety and pale, often mixed with blood and various other fluids. These changes in the quantity and qualities of the secretion are effected most rapidly, they may indeed all occur in the course of three or four days; that is, the disease may appear, and at its onset be attended with a puriform discharge mixed with mucous and lachrymal secretions, and in the space of time just mentioned, the qualities of the discharge may indicate the subsidence of acute symptoms, and the injury consequent on their previous existence. Dupuytren mentions that he has frequently known the disease to begin and to terminate by collapse of the eye-ball in seven days.

Termination or effects of the disease.—This disease may, under favourable circumstances—that is, if it be promptly and actively treated, in an otherwise healthy

individual—terminate without leaving behind any traces of its former existence, except a slight enlargement of the vessels of the conjunctiva with some degree of irritability of the eye; or, it may produce that state of thickening and vascularity of the conjunctival covering of the cornea, which is termed pannus; or it may leave behind an œdematous condition, or a chemosed state, of the conjunctiva; or it may render the surface of that membrane uneven, it may be elevated into minute granulations, (granular conjunctiva); or it may give rise to more considerable projections, (fungous growths, or vascular productions from the conjunctiva); it may occasion adhesion between the eye-lid and the eye-ball (symblepharon), if the medical attendant does not take the necessary measures to prevent such an occurrence. When, therefore, those points of the chemosed surface, which have been in contact for some time, become ulcerated, occasional motion of the eye-lid, and the introduction of a little olive oil between it and the eye-ball, must be had recourse to.

The cornea may become opaque, and this opacity, (as was mentioned when speaking of purulent ophthalmia,) may be dense or otherwise, superficial or deep-seated, extensive or limited; or it may ulcerate, and the ulceration may be confined to the superficial layers or its interior laminæ, or it may take place within its lamellæ; it may also occupy a greater or lesser extent of surface, varying from a mere point to a great portion of its entire dimensions. The cornea may be rendered gangrenous, and this state of gangrene may vary in extent, but I think it always *commences* in its external layers. If the cornea perish in consequence of the existence of chemosis, its external layers first perish, because the circulation of that part of its outer covering, through the medium of which it obtains its vascular supply, is destroyed; but this effect may not

take place throughout the whole of its external surface; first, because the pressure of the chemosis, and, consequently, the strangulation of the circulation, may be partial; and secondly, because its progress may be arrested—after it has commenced at a given point, it may extend to a certain distance, and be then checked by treatment, or by other means, or the gangrenous spot or the perished layers may be thrown off, and the part beneath be left in a state of ulceration, and pass through the various changes peculiar to that condition of disease.

Lymph may be effused, and may occupy the whole pupil, or it may cover the anterior capsule, forming a lymph cataract; the iris may become fixed to an ulcer of the cornea; or it may become prolapsed and produce a closed pupil, or it may become adherent throughout the whole or a part of its pupillary margin, to the anterior capsule.

Suppuration, and consequent collapse, of the eye-ball is apt to occur; and, in such case, the contents of the globe are discharged through an opening in the cornea or sclerotica, but more generally through an aperture in the cornea,* and after the shrinking and contraction of the

* When the cornea gives way and the contents of the eye-ball are discharged, it has been stated that the texture of the cornea bursts by the action of the muscles of the globe during a paroxysm of pain. I am assured from very repeated and attentive observation, that the cornea does not yield in these cases unless it has been previously weakened by ulceration, or by the detachment of some of its layers by sloughing. If some of the laminæ of the cornea perish from the existence of chemosis, or other causes, it may burst during the spasmodic action of the muscles of the eye-ball, and the same thing may happen if its lamellar texture be absorbed by the occurrence of inflammatory deposits between them. If a circumscribed and deep, or a large and superficial ulcer of the cornea be present, its texture may give way—be lacerated—by the mere agency of the muscles of the eye-ball, but I believe no such event takes place so long as the corneal texture has not experienced some one or other of these changes. A mere increase of the contents of the eye-ball unassociated with impaired vitality or loss of substance on the part of their containing membranes, is not competent to produce their disruption.

remaining portion of the tunics, there will remain a small round button-like knob, to which the muscles of the eye-ball are attached. This button-like tubercle has generally a depression in its centre, into which an artificial eye may, if required, be fitted. However the tunics of the ey may be merely extenuated, the cornea or the sclerotica, but much more commonly the cornea, after having been weakened by inflammation and absorption, may project externally, and not merely produce deformity, but excite that amount of irritation which may render the removal of its most prominent point necessary equally for the patient's comfort and the safety of the opposite organ. Now, staphyloma is of various kinds, as will be afterwards explained, and it has received various names in accordance with the appearance it assumes and the part it involves; that is, whether it be produced by the yielding of the cornea or the sclerotica singly, or by that of both these parts; whether it be a large even projection; a small abrupt and very prominent one; or an irregularly tuberculated enlargement. It will be remembered that it is not formed whilst the external tunics remain healthy, but, if ulceration, absorption, or other causes have weakened them, then it may take place.

The inflammation I have just described, as capable of producing such various pathological states of the organ of vision, may vary in its degree, and may be either confined to the conjunctiva or may extend to other parts, and these circumstances have induced Mr. Lawrence to divide this disease into three distinct forms; namely, "1st, Acute inflammation of the conjunctiva;—2nd, Mild inflammation of that membrane;—and 3rd, Inflammation of the sclerotic coat, sometimes extending to the iris."* I have not been

* See his work *On the Venereal Diseases of the Eye.*

able to detect this last form of gonorrhœal ophthalmia, as described by Mr. Lawrence; the best attention I have been able to bestow upon this subject has not enabled me to detect any primary inflammation of the sclerotica, as a form of gonorrhœal disease of the eye in that sense of the term in which I have previously employed it when speaking of gonorrhœàl conjunctivitis.

Diagnosis.—The diagnosis of gonorrhœal ophthalmia is somewhat difficult, inasmuch as it bears a strong resemblance to another form of inflammation of the conjunctiva, attended with purulent secretion. Many of its prominent characters are occasionally exemplified in the acute purulent ophthalmia of adults. Thus there is in both tumefaction of the lids, great chemosis and profuse puriform secretion; however, gonorrhœal inflammation of the conjunctiva is generally accompanied by these phenomena to a much greater extent than the purulent ophthalmia, although a severe case of the one, and a mild attack of the other, cannot be distinguished by these circumstances alone. Gonorrhœal ophthalmia is almost invariably confined to one eye, and affects the whole of the mucous membrane almost equally, whilst purulent ophthalmia more commonly commences in the palpebral portion of the conjunctiva, and attacks both eyes at, or very nearly at, the same time. And here also it must be remembered that exceptions sometimes, though rarely, occur, for gonorrhœal ophthalmia has been known to attack both eyes at, or nearly at, the same time, and purulent ophthalmia has been limited to one eye. Lastly, we must endeavour to discover if the individual has been particularly exposed to the risk of receiving gonorrhœal contamination, and if this circumstance can be clearly discovered, we may be tolerably sure, if the other symptoms are present, that the disease is gonorrhœal ophthalmia, even though he should be

unconscious of the fact, by the occurrence of any painful or uneasy sensation at the period of contact, that gonorrhœal matter has been applied to his eye; and, even if we are mistaken, it will be an error on the safe and judicious side, an error that will only lead to increased attention to the case and greater activity of practice than would be otherwise employed.

Permit me to place before you in direct contrast, a summary of the chief characters of these two acute diseases:—

Characters of gonorrhœal ophthalmia.—Course very rapid—symptoms extremely severe—termination very frequently destructive to vision. It rarely attacks both eyes at the same time—commences in the whole mucous membrane, quickly producing chemosis with profuse purulent secretion and great tumefaction of the palpebræ—and, has some relation to, or connexion with, gonorrhœa.

Characters of simple acute purulent ophthalmia.—Generally commences in the palpebral portion of the conjunctiva—symptoms less severe than those of gonorrhœal ophthalmia—course less rapid—termination less frequently destructive to vision—generally attacks both eyes at the same time—has no connexion with gonorrhœa—the swelling of the lids, the chemosis and the amount of discharge, are less than in the gonorrhœal inflammation of the conjunctiva.

Prognosis.—A knowledge of the obstinacy of the disease, and of our incapacity to control it effectually by the remedies ordinarily employed for the subduction of other forms of acute conjunctival inflammation, and an acquaintance with its general mode of termination, would at all times dispose us to hold out very little hope, or, at all events, to excite no sanguine expectation, of the recovery of perfect vision. Knowing that even though you may see a patient as soon as the disease commences, and employ

with the utmost promptitude the most active and judicious treatment, the disease will, in some instances, proceed to destroy the organ of vision, you would, I repeat, be guardedly cautious in your prognosis, and by no means hazard your professional reputation by holding out a prospect of the eventual recovery of unimpaired vision. If this be true with regard to a favourable opportunity of treating the disease, you can imagine what kind of opinion it will be right to give in reference to the ultimate effect of the malady upon vision, when it has been permitted to continue during two or three days without the employment of any measures to arrest its progress and lessen its severity. However, when the disease has affected both eyes, and has occurred in one eye so severely as to destroy or seriously injure it, we may be prepared to speak more favourably in reference to the effect of the malady upon the other. For it unquestionably happens that the destructive severity of the complaint in one organ appears to divert a certain degree of its force and virulence from the other. At all events, I have many times witnessed the preservation of one of the eyes under the circumstances I have just pointed out.

Causes.—The chief objects of inquiry connected with this department of our subject are:—*first*, does there exist a necessity for the direct application of the matter of gonorrhœa to the conjunctiva, in order to excite gonorrhœal ophthalmia? and is it necessary that the matter so applied should proceed from the urethra or vagina of the same individual, or from that of some other person? in other words, if matter be taken from the urethra of a person labouring under gonorrhœa, and applied to his eye, will it excite, is it competent to excite, gonorrhœal ophthalmia? or, is it necessary for the production of the disease of the eye, that the matter applied to the conjunctiva be

taken from the urethra of some other person who may be suffering from gonorrhœa?

Secondly.—Can the eye become affected with gonorrhœal ophthalmia on the principle of metastasis? in other words, can the diseased action going on in the urethra or vagina, constituting what is termed gonorrhœa, suddenly cease, and be transferred to, or become evident in, the mucous membrane of the eye, as rheumatism and gout change their seat, and have their action transferred?

Thirdly.—Can the existence of gonorrhœal inflammation of the urethra or vagina produce that state or character of constitution which permits and excites gonorrhœal ophthalmia, independently of the actual contact of the particular morbid discharge, in the same way as the iris sometimes becomes inflamed from the previous existence of chancre—that is, by imbuing the constitution with certain principles, by the agency of which it receives a disposition to excite peculiar local action in particular parts, organs or districts?

Fourthly.—Does there exist a necessity for any peculiar state of constitution, either natural or acquired, or any particular condition of health, to determine the commencement, and permit the development of gonorrhœal inflammation of the conjunctiva?

In order to determine whether or not the discharge from the urethra of an individual labouring under gonorrhœa, possesses, when applied to the conjunctiva, the power of exciting gonorrhœal ophthalmia, Dr. Vetch states that an hospital assistant applied the matter of gonorrhœa from his own urethra to the conjunctiva of each eye, without producing the gonorrhœal disease in that part;* and certainly, if experiments such as this were conducted on an extensive scale, the fact would soon be decided, but as this

* *A Practical Treatise on the Diseases of the Eye*, p. 243.

is not likely to be done, we must judge from evidence of a less satisfactory nature; for it would be obviously wrong to say, from a solitary experiment of this description, (which the zeal of few will dispose them to repeat,) it would, I say, be quite wrong to consider such evidence decisive of a fact so highly important; inasmuch as there are many persons whose urethræ seem averse to receive the contagion of gonorrhœa, and further, because inoculation of every description, however carefully and perfectly conducted, will sometimes fail. I know a gentleman who has been affected with chancre at least five or six times, although he has never yet suffered from gonorrhœa, and as I feel confident he could not have indulged his propensity for illicit and promiscuous intercourse, as he confesses he has done, without being occasionally exposed to the risk of receiving the gonorrhœal contagion, I conclude that in his case there is either wanting altogether, or in a great measure, that local aptitude which is required for its reception. Dr. Vetch mentions, that although the discharge from the eyes of patients labouring under the acute purulent ophthalmia did not, when applied to their urethra, produce purulent inflammation of that part, yet, when the same kind of discharge was taken from the eye of one patient, and applied to the urethra of another, the disease was quickly evinced. (*Op. cit.* p. 242.)

There is yet another circumstance to which your attention must be directed, namely, the very rare occurrence of gonorrhœal ophthalmia, compared with the frequency of gonorrhœa. If you, for a moment, reflect upon this subject, you will imagine that very many patients labouring under the latter disease, particularly those of uncleanly habits, touch their eyes with the discharge from their urethra, and yet it is very unusual for such persons to suffer from gonorrhœal conjunctivitis; whilst comparatively few are exposed

to the contagion from others; or at least, they who merely associate with persons suffering from gonorrhœa, are only occasionally and very indirectly exposed to its contagious influence, whilst they who are actually suffering from gonorrhœa, are very frequently exposed to the risk of transferring the urethral discharge to their eyes.

It has been stated that gonorrhœal conjunctivitis is almost invariably confined to one eye. Now, if gonorrhœal ophthalmia were capable of being produced in an individual from secretions proceeding from his own urethra, it is almost impossible to deny that the discharge from one eye is adequate to affect the other, and yet it seldom happens that both eyes are diseased at the same time, although it is scarcely conceivable that any amount of caution would enable him to prevent the discharge of one organ from touching its fellow. Can you imagine that if the gonorrhœal discharge from the urethra of a patient, were, when applied to his eye, capable of producing gonorrhœal ophthalmia of that eye, that the application of the matter from the inflamed organ to the conjunctiva of the healthy eye, would be incapable of producing a similar state of disease in that tunic? Taking these various circumstances into consideration, it certainly does seem improbable that a person can infect himself; that even if he were to touch his eyes with the discharge, it would not excite this disease, although until this fact be most unequivocally established, it is right to request such patients as may be suffering from gonorrhœa to be extremely cautious and not needlessly peril the safety of their eyes. Mr. Pearson's testimony upon this subject is by no means destitute of value; that eminent surgeon declares that during a pretty extensive practice of twenty five years, he has never seen a single case of gonorrhœal ophthalmia.* It is

* See note to Briggs's Translation of Scarpa *On the diseases of the Eye*, page 186.

hardly possible to conceive, that if the conjunctiva could be contaminated, as has been represented, by the discharge from their urethra, that that event would not have happened to some of Mr. Pearson's patients, and it would be a gross injustice to his habits of reflection and his acknowledged professional attainments to suppose that if such an occurrence had taken place it would have escaped his observation. This view of that gentleman's opinions not only affords strong evidence of the impossibility of self-contagion, as respects gonorrhœal inflammation of the conjunctiva, but also explains the reason why gonorrhœal ophthalmia was not considered by him to have any connexion with, or dependence on, gonorrhœa; his patients would, under this view of the subject, be exempt from it, and as he had not an equal reputation for the cure of diseases of the eye, it is by no means improbable that when person's eyes were affected by his gonorrhœal patients, they were seen by other medical men who possessed as great a reputation for the cure of ophthalmic diseases as he enjoyed for the treatment of syphilitic affections. This seems the more probable when we consider that very few cases of gonorrhœal ophthalmia present themselves at institutions founded for the specific purpose of attending to ophthalmic affections, where patients (particularly those who are most obnoxious to this malady, I mean the poor, and those who are uncleanly in their habits,) would be most likely to apply, under such circumstances, for relief. Mr. Lawrence states, that in nearly four thousand persons annually attending at the Moorfields Eye Infirmary, there are very few who are affected with gonorrhœal ophthalmia. I cannot imagine, that if the matter from the urethra of an individual suffering from gonorrhœa were capable of producing gonorrhœal conjunctivitis when applied to the eye, that this severe form of ophthalmic inflammation would be so extremely rare

and infrequent, as the experience of all writers on the diseases of the eye, and as my experience at the Birmingham Eye Infirmary agree in representing it to be.

We now arrive at our second inquiry; namely, can the mucous membrane of the eye become affected with gonorrhœal inflammation on the principle of metastasis? On referring to the work of Professor Scarpa* you will find that he is an advocate for this opinion; he says, that on the sudden suppression of the gonorrhœa, the affection of the eye commences; that is, when the gonorrhœal discharge from the urethra becomes suddenly suppressed, the morbid action is transferred to the mucous membrane of the eye, and leads to the same result, namely, puriform secretion;† and you will notice that this celebrated surgeon endeavours to establish a distinction between those cases in which the conjunctiva is inflamed from the metastasis of gonorrhœa, and those in which it arises from the direct application of gonorrhœal discharge, by stating, that the symptoms are not so violent in the latter case as in the former; a distinction which in spite of its non-existence in nature we are almost tempted to believe on such au-

* See Léveillé's translation. Tom. i.

† The appearance of gonorrhœal ophthalmia, so distinctly stated by Sauvages, St. Yves, Erudtelius, Burserius, Scarpa, Robertson, Edmonston, Benedict, and Dupuytren, to succeed, in some instances, the sudden suppression of the urethral discharge, has induced the last mentioned author to recommend great caution in the use of astringents for the removal of that malady. Dr. Edmonston has made the following interesting remarks relating to the connexion subsisting between gonorrhœal inflammation of the conjunctiva and of the urethra. "From what I have observed in these cases, and from an examination of the statements of others, I think it will in general be found to hold, that it is chiefly during the first and inflammatory stage of gonorrhœa that its suppression is likely to produce this virulent ophthalmia; and that, after it has continued some time, and the inflammation has abated considerably, even a sudden suppression of the discharge at the urethra is not followed by any affection of the eye." (*A Treatise, &c.* p. 147.)

thority. Saint Yves remarks upon this subject, that the gonorrhœal ophthalmia generally appears "two days after the beginning of a virulent gonorrhœa. The matter being suppressed from the penis, seemed to pass through the eyes, staining the linen in a similar manner." The learned Sauvages thus refers to gonorrhœal ophthalmia:— "Metastatica ophthalmia non remittit circa auroram, abit semper in chemosim, materies morbifica in istâ sedem mutat, dolores acriores infert, non aufertur syphilide sanatâ, periculosior est.

Calorem, dolorem, ruborem in lecto crescere, hoc viru syphilidis venereæ tribuendum, necnon morbus vulgaribus remediis resistat ophthalmia metastatica ex tumore scleroticæ ejusque livore ac dolore acri et lancinante, depressa quasi intra foveolam corneâ cognoscitur, necnon ex eo quod à repressâ gonorrhœâ per metastasim virus in oculum factam accedat, atque utplurimùm gonorrhœa priùs insanabilis obortâ hac ophthalmiâ evanescat, et reciprocè gonorrhœâ abortâ recedat." (Tom. 2. p. 65.)

Astruc, who has given a very elaborate account of gonorrhœal ophthalmia, speaks very decisively with regard to the metastatic origin of the malady. One of the sections (*De ophthalmia gonorrhoica, quæ suppressæ gonorrhœæ quandoque supervenit*) of his large work, is thus commenced. "Si gonorrhœa venerea errore in diætâ, crapulâ, veneris usu, vigiliis nimiùm protractis, exercitio immoderato, exhibito acriore cathartico, morbo quodam adventitio, aut casu quovis alio supprimatur, parciùsve manet; imò quamvis liberè manaverit, si summâ virulentiâ exsuperet, inde accidit aliquando in utroque sexu, ut alteruter vel uterque oculus gravi et repentinâ tentetur ophthalmiâ, quæ sui generis est, ex quâ summum periculum oculo portenditur, cujus hæc est formæ et progressionis ratio." (*Lib.* iii. *Cap.* iii.)

Dupuytren observes, in his *Leçons Orales*, that in some cases, gonorrhœal ophthalmia appears on the sudden suppression of the urethral discharge. "In the three cases' (cases mentioned in his book) the discharge from the urethra was evidently diminished or suppressed from the beginning of the ophthalmia." Swediaur, p. 244. "Altera causa gonorrhœæ oculi ex gonorrhœa genitalium suppressa originem ducit." Benedict, §. 492.

Now, although I will not presume to place my experience, on a level with the unusually laborious and extensive sphere of observation, possessed by the authorities just quoted, I could wish to mention, that in no instance within my own knowledge in which a patient labouring under gonorrhœa has been the subject of gonorrhœal ophthalmia, has the discharge from the urethra been materially, and very rarely, at all diminished in quantity, and in proof of the correctness of this representation, I may refer to almost every admitted authority of the present day; and, as in other instances of what is termed metastasis, the morbid action cannot properly be said to be established in a new situation until it has quite, or almost entirely, quitted its original seat, the notion of metastasis with regard to gonorrhœal ophthalmia, under the circumstances I have just explained, cannot be admitted.* For instance, if a patient were affected with rheumatism of the joints and were afterwards to have an attack of pericarditis, which from its characters you would judge to be rheumatic, the pain in the joints still continuing as severe as prior to the pericardial affection, you would not say metastasis has taken place, for that would imply a change in the seat of the disease, which has not occurred, there being

* I am acquainted with the opinions of Abernethy and Vetch upon this subject, and shall refer to them when treating of rheumatic sclerotitis.

only superadded action or additional disease. You would, with much greater propriety, allow that the condition of the constitution disposing to rheumatic action, had permitted that action to arise and become developed in the two situations at the same time.

Most of the continental writers, and among others the celebrated BEER, endeavoured to reproduce, as they termed it, the discharge from the urethra, when persons were suffering from gonorrhœal ophthalmia (in consequence, as they presumed, of suppressed gonorrhœa,) by means of bougies smeared with gonorrhœal discharge introduced a certain distance down the urethra,* and I have no doubt that, with an impression of this kind upon the mind of the surgeon, many patients affected with gonorrhœal ophthalmia have been persuaded to admit a new disease; to allow themselves, in short, to receive, in this unpleasant manner, gonorrhœal inflammation of the urethra with a view of curing the inflamed eye. Now, you will see persons affected with gonorrhœa, attended with very free discharge, suffering at the same time from gonorrhœal ophthalmia† of a most severe and active character, (DUPUYTREN, EDMONSTON, VETCH, DELPECH) at once refuting the accuracy of the opinion I have just quoted, and at the same time proving the impropriety and

* This practice is also recommended by PLENCK, LANGE, and SWEDIAUR. "Prognosis porro magis fausta adest, si medicus sub initio mali accesitus gonorrhœam suppressam citius poterat revocare, præsertim muci secretione in oculo nondum incepta. Etenim citius tunc ophthalmia sanatur.

"Restitutio gonorrhœæ suppressæ primum et maxime necessarium erit remedium ad hujus mali sanationem. Aptissime et ratione maxime secura nova gonorrhœæ per mucum venereum insitione per cereolum, quem gonorrhaicus in urethra gesserat facta hoc peragitur." BENEDICT, § 506. We are not surprised to find him stating immediately afterwards, "Plurimi ægrorum, ab hacce methodo abhorrentes, *cereolum admittere nolunt.*" *(Loc. cit.)*

† This is denied by SWEDIAUR.

the inadequacy of the practice founded thereon; for, it is evident that if, in the case before us, a free discharge from the urethra were capable of curing the disease of the eye, it must necessarily be cured, and vision most certainly preserved; but such is not the fact, for cases of this description are as severe, and are generally attended with quite as much injury to vision, as any others in which no such combination of disease exists—certainly as severe as those cases of gonorrhœal ophthalmia which are unattended with urethral discharge. You will therefore see the impropriety of producing an additional disease for no useful purpose. Does it not occur to you that the same discharge that affected the urethra may also affect the eye, and thus produce the disease of both textures almost or quite simultaneously? To explain myself more fully—a person may receive, by intercourse, gonorrhœal inflammation of the urethra and of the mucous membrane of the eye at the same time, the effect of which may be developed in those respective parts almost simultaneously.* I have, however, seen gonorrhœal ophthalmia less frequently in conjunction with purulent discharge from the urethra than without it; and in nearly every case where there has been gonorrhœal inflammation of the eye and of the urethra at the same time, attended with very free discharge from each, I have had the strongest reason to believe that the disease, in both these situations, arose from the contact of matter proceeding from the same source—the same individual. But even admitting that the matter of gonorrhœa may be applied to the mucous membrane of the eye and to the urethra at the same time, it does not of course necessarily follow that the effect of

* I have only omitted to relate cases in direct proof of this statement by an unwillingness to lengthen my observations.

such application should be developed in both situations at precisely the same period. This will, in a great measure, depend on the quantity of matter applied, the period during which it is allowed to remain in contact with the part, and on many other circumstances of a similar nature.

I am aware that Mr. Mackenzie* (who admits that a person suffering from gonorrhœal inflammation of his urethra may produce gonorrhœal ophthalmia by touching his conjunctiva with the discharge from his urethra,) explains the infrequency with which gonorrhœal conjunctivitis occurs, by stating that it is extremely difficult for an individual to convey the matter to his conjunctiva, "on account of the instant closure of the eye-lids when the finger (or discharge) approaches the eye." I admit that it is difficult to apply the matter of gonorrhœa to the conjunctiva, but of course I do not coincide in the former part of Mr. Mackenzie's statement. I do not think it is at all satisfactorily proved that the matter of gonorrhœa taken from the urethra, and applied to the conjunctiva of the same individual, is capable of giving rise to gonorrhœal ophthalmia, and, of course, I do not believe that this is the mode in which this disease is generally propagated.

We have now to consider how far gonorrhœa is capable of affecting the constitution; in other words, can that disease, which we term gonorrhœa, contaminate the constitution, and dispose it, or enable it, to produce local disease attended with purulent secretion, such as proceeds from an eye affected with gonorrhœal ophthalmia? The iris sometimes becomes inflamed—peculiarly inflamed—after chancre, and when this is the case, we say that part is so inflamed in consequence of some change in the constitu-

* *A Practical Treatise on Diseases of the Eye*, p. 366. London, 1830.

tion effected by the agency of the syphilitic sore. Can the absorption of gonorrhœal matter take place and effect a change in the constitution capable of producing gonorrhœal ophthalmia, independently of the direct application of the urethral discharge to the conjunctiva? This is, indeed, an important and interesting inquiry, and I must confess that although my attention has been frequently directed to this subject, I am by no means prepared to state positively that the occurrence may not take place. Persons have fallen under my care with gonorrhœal ophthalmia, and have assured me that they have not, for some time previously, incurred the slightest risk of having gonorrhœal matter applied to the eye, and in one instance the peculiar circumstances of the case rendered it most improbable that the patient could have been affected by any cause of this nature, yet not only had he a decided attack of gonorrhœal conjunctivitis, but one of so severe a nature that his vision was totally destroyed; on the other hand, females who are affected with gonorrhœal inflammation of the vagina, are very seldom affected with the same kind of inflammation of the eye. We know that they suffer equally with men from the secondary symptoms of syphilis, and if we admit that gonorrhœa, like syphilis, is a constitutional disease—that it is capable of so affecting the constitution as to qualify it to produce the local effect or malady to which I am now referring—it requires some ingenuity of argument to explain the cause of this anomaly; indeed this circumstance would at once decide the question in the negative, if we did not occasionally meet with instances such as have been now alluded to—instances in which gonorrhœal ophthalmia has occurred in an individual some time after he has had gonorrhœa, under circumstances rendering it almost impossible for him to

have contracted the disease of the eye from the application of gonorrhœal matter to that organ. If you can reconcile these facts, namely, 1, the extremely rare occurrence of gonorrhœal ophthalmia in females compared with the frequency of its occurrence in males; 2, its almost invariable limitation to one organ; 3, its occasional simultaneous occurrence with gonorrhœal inflammation of the urethra; if, I say, you can reconcile these various facts with the idea of a constitutional disease of this nature, (strictly so called) you may conclude that the absorption of gonorrhœal matter may occur, and give rise to a state of constitution adequate to the production of gonorrhœal ophthalmia.

Again, if the existence of gonorrhœa were competent to excite a condition of constitution capable of producing gonorrhœal ophthalmia, surely the latter disease ought to be more frequent in women than in men, inasmuch as the extent of surface affected with the gonorrhœal inflammation is greater in the former than in the latter. For, I apprehend, it would be a manifest absurdity to state that a malady of this nature, adequate to affect the constitution in a particular manner when it exists on a limited extent of surface, is incompetent to produce the same effect when present in an equal degree on a much greater extent of surface. However, as the whole of this investigation bears chiefly upon another inquiry, namely, the constitutional nature of gonorrhœa—by which I mean, its capacity to affect the constitution so as to lead to certain local maladies—I shall content myself with referring you to some of those authors who have written upon this particular subject; your time will not be misemployed, even presuming the question remain undetermined in your own mind, for you will find in the valuable

works of HUNTER,* ASTRUC,† FOOTE,‡ HOWARD,§ TRAVERS,‖ BACOT,¶ SWEDIAUR,** WHATELEY,†† LARREY,‡‡ JACOBS,§§ and CARMICHAEL,¶¶ information which cannot fail to be useful.

If the conjunctiva were capable of assuming that pathological condition which we term gonorrhœal conjunctivitis, in consequence of merely the absorption of matter proceeding from the inflamed urethra into the constitution, we should certainly expect that when gonorrhœal ophthalmia occurs from the positive contact of gonorrhœal matter, the urethra would, on the same principle and in the same proportion of cases, become affected with the true puriform inflammation. But no such event has been stated to occur by those, who, from entertaining the foregoing opinion, would have been glad to avail themselves of so strong an argument in support of their doctrines, if the circumstance on which it is founded really existed.

You will not understand me to say, that the absorption of a morbid secretion, possessing when absorbed, a capacity to contaminate the constitution and dispose it to

* *A Treatise on the Venereal disease.* ADAMS's Edition, London, 1818.
† *De Morbis Venereis.* 1740.
‡ *Observations upon the new opinions of* JOHN HUNTER. London, 1786 and 1787.
§ *Practical observations on the natural history and cure of the Venereal disease.* London, 1806.
‖ *Observations on the Pathology of Venereal affections.* London, 1830.
¶ *Observations on Syphilis &c..* London, 1821.
** *A Treatise upon the symptoms, consequences, nature and treatment of Venereal diseases.* London, 1819.
†† *On the gonorrhœa virulenta.* London, 1801.
‡‡ *An enquiry into some of the Effects of the Venereal Poison.* London, 1802.
§§ *Démonstration de l'indentité des virus de la verole et de la Gonorrhée.* Bruxelles, 1811.
¶¶ *Observations on the Symptoms and Specific distinctions of Venereal diseases.* London, 1818.

develop the existence of such contamination by the establishment of some local disease, must necessarily give rise to a malady similar to that whence the disease originated. The absorption into the constitution of the secretion from a chancre may give rise to many and very various local maladies, which have no resemblance to each other, at least in their external characters; and such also is the case with respect to many other diseases and their consequences.

It has been mentioned by various authors that gonorrhœal inflammation of the conjunctiva may occur from sympathy—as a definite and distinct result of sympathy—with the inflamed urethra.* I have had some reason to

* "The translative (gonorrhœal) ophthalmia frequently follows soon after an injudicious stoppage of a gonorrhœa, the venereal virus being translated into the eye. It has also been observed, that a gonorrhœa, which before seemed incurable, has, upon the coming on of this ophthalmy, suddenly vanished; and in like manner the ophthalmy has gone off, upon the return of the gonorrhœa." CHANDLER, p. 140. "In consequence of an intimate connection subsisting between the urethra and the eye, from the continuity of the mucous membrane that lines both, and from its structure and function being the same in each, there exists a sympathy between these organs, (the eye and the urethra) rendering the one susceptible of the affection of the other: that upon this sympathy depends, in many instances, the sudden translation of morbid action or disease from one part to another and that among others of a similar kind, to its agency may be ascribed the appearance of ophthalmia, in consequence of a suppressed gonorrhœa." EDMONSTON, p. 166. "I am inclined to refer the occurrence of gonorrhœal ophthalmia to the state of the constitution without being able to point out in what that state consists; and to regard it as a pathological phenomenon analogous to those successive attacks of different parts which are observed in gout and rheumatism." LAWRENCE, p. 34. "Ætiologia ophthalmiæ gonorrhaicæ duplex erit. Etenim ex veneno oculis ipsis illato vel per *consensum* ex gonorrhœa suppressa exoritur." BENEDICT, § 491. "Peut-être s'approchent-ils plus de la vérité ceux qui regardent ce phénomène (the occurrence of gonorrhœal ophthalmia on the material diminution or suppression of the urethral discharge) plutôt comme *une liason consensuelle entre l' urètre et les yeux*, que comme une véritable transposition de matiere, la membrane interne de l'urètre, celle des paupières, de la gorge et du rectum, étant des productions de la peau. Si cet effet ne se manifeste pas dans tous les cas de suppression imprévue de la gonorrhée, c'est parce que tous les individus ne sont pas doués du même degré *de sensibilité consensuelle*." LÉVEILLÉ's translation of SCARPA, T. 1. p. 246.

believe that this view of the matter is correct—that gonorrhœal ophthalmia may so arise in a few instances. But it may be stated, in objection to the correctness of this supposition, that the disease occurs very rarely in women, as compared with men, that it generally attacks only one eye, and that it may also exist where no previous gonorrhœa has taken place, and that it may be present where the urethral discharge is copious as well as where it is scanty or entirely suppressed. It must indeed be a peculiar sort of sympathy that would equally operate under such different circumstances. Besides, it must not be forgotten that there is, at least, no reacting sympathy—that is, admitting the sympathy of the conjunctiva with the urethra, there is no returned sympathy on the part of the urethra with the conjunctiva; for, in clear and decided examples, (the well-authenticated ones of DELPECH,* WARDROP,† ALLAN,‡ and BACOT,§ for instance,) in which matter has been taken from the inflamed urethra or vagina of one person and applied to the conjunctiva of another, and given rise to gonorrhœal ophthalmia in its most acute form, the urethra or vagina of such patients has sustained no irritation—it has, in fact, experienced no sympathetic inflammation. I repeat, therefore, that the occurrence of gonorrhœal inflammation of the conjunctiva, as a clear and legitimate consequence of sympathy with the inflamed state of the urethra, is extremely questionable.

I have yet to inquire if there be any particular kind of constitution, or any peculiar state of health, necessary to the development of gonorrhœal ophthalmia, independently of that (as some appear to think) condition, arising from

* *Chirurgie Clinique*, Tom. 1. p. 318.
† See LAWRENCE's *Treatise on the Venereal diseases of the Eye*, p. 32.
‡ *System of Pathological and Operative Surgery*. Vol. i. p. 152.
§ *Treatise on Syphilis*, p. 132.

constitutional impregnation with gonorrhœal virus, or that state of things which has been vaguely designated metastasis. Mr. Ware states that he has noticed its occurrence after the free administration of mercury for the cure of a gonorrhœa, and other persons have made observations of a similar description, as though, indeed, it were excited by the previous administration of mercury, but I do not think there is the slightest foundation for this opinion. Gonorrhœal ophthalmia is known to take place in persons of different temperaments and habits of body, in every grade of health from puny infirmity to florid and vigorous health; and although I possess the notes of many such cases, I cannot trace its connexion with any particular state of health, or any kind of subject possessing distinct and peculiar constitutional characters.*

Again, can a person labouring under gonorrhœal inflammation of the eye contaminate the air for a *certain distance*, and imbue it with those exhalations by which it is rendered capable of exciting a similar disease in the conjunctiva of a person whose eye is exposed to the prolonged influence of such an impure and contaminated atmosphere?† You will perceive that it is of some consequence in reference to nurses, and even medical men, who attend such cases, to investigate this subject attentively. I must however admit that my experience has not qualified me to lay before you any positive facts upon the subject, but let me advise you to act upon the supposition that this view of

* "In three cases where I had occasion to see this ophthalmia, it appeared in winter in cold climates, after the patient, labouring under a recent blennorrhagia, or, as it is commonly called, a virulent gonorrhœa, had exposed himself to severe cold in the open air." Swediaur, *Treatise*. &c., p. 244. Dupuytren and Scarpa mention exposure to cold as materially assisting the operation of the contagious agent.

† See upon this subject the opinions of Dr. Edmonston contained in his work, to which I have previously referred.

the matter is correct, and do not needlessly place your own eyes very near to those of such patients as may be suffering from gonorrhœal ophthalmia, for a long period at any one time, particularly after they have been bathing or fomenting them, as at such time evaporation is rapidly and freely taking place from the surface of the eye. Perhaps however this inquiry is one of curiosity rather than of practical utility—I know that the evaporation of the fluid parts of the matter proceeding from the surface of an eye affected with gonorrhœal ophthalmia is not *likely* to communicate the same disease to the mucous membrane of a healthy eye when placed near to it and long subjected to its influence, but is there any thing in the nature of these circumstances to render such communication of morbid affection *impossible?*

I think we may fairly deduce from these remarks upon the causes of gonorrhœal ophthalmia, 1, that by far its most usual mode of production is by the contact of gonorrhœal matter proceeding from the urethra or vagina of some other person—not from that of the individual himself; 2, that it is extremely improbable that any individual can communicate the disease from his urethra to his conjunctiva merely by touching the latter membrane with the gonorrhœal discharge proceeding from his inflamed urethra; 3, that it does not arise in any instance from true metastasis; 4, that the occurrence of gonorrhœal inflammation of the conjunctiva, as a distinct result of sympathy with the inflamed urethra, is at least questionable—by no means satisfactorily proved; 5, that the more or less severe degree of the gonorrhœal conjunctivitis mainly depends on the condition of the discharge applied, the constitutional circumstances of the individual to whose eye it is applied, and the more or less complete and prolonged application of the morbid matter to the surface of the conjunctiva.

Treatment.—It will be remembered that gonorrhœal ophthalmia is characterized by symptoms of a most acute kind, that its progress is extremely rapid, and that it frequently terminates in the destruction of vision. Hence you will be aware of the great necessity for prompt and decisive treatment. The practice of reproducing the discharge from the urethra,* (as its disciples termed the infliction of a clap,) as already explained, is, on this account, most objectionable, inasmuch as it cannot fully take place in sufficient time to prevent many of the ill effects consequent on the brief existence of symptoms so severe as those of gonorrhœal conjunctivitis; independently, therefore, of the error of considering that the suppression of the gonorrhœa excites the inflammation of the eye, the practice founded on this belief is most defective, because tardy in its operation and quite inadequate to the removal of so severe a disease. These alone constitute important objections to the adoption of such a means of cure; but when you are assured that the disease of the eye may supervene upon that of the urethra, the discharge of which has never been either diminished or suspended, and that both may proceed at the same time with extreme violence and severity, you will be satisfied that no reliance whatever can with propriety be placed upon this ridiculous and mischievous practice.

* Baron Larrey states that purulent inflammation of the conjunctiva occurring in persons who had previously suffered from gonorrhœa was readily cured, by reproducing the inflammation of the urethra, which he accomplished by the injection of a sufficiently strong alkaline solution. "Si vero medicus cogatur gonorrhœam snppressam ulla alia ratione revocare, varia huncce in usum suaserunt. Cereoli immissio murcurio præcipitato rubro conspersi, aut solutione mercurii sublimati corrosivi vel lapidis infernalis in aqua facta tincti hanc ob causam præsertium commendatur. Si per aliquod horas in urethra jacuit, exinde oritur dolor, tumor et inflammatio illius partis, mucique crebra secretio, qua suborta gonorrhœa oculi et reliqua ejus symptomata imminuuntur." Benedict, §. 507.

The important part of any plan of treatment employed for the cure of gonorrhœal ophthalmia must obviously mainly consist in its power of lessening general and local action, in preventing the external layers of the cornea from sloughing in consequence of the pressure of the chemosis, and also in preventing the extension of the disease to the deeper-seated textures.

You will deem it necessary, in order to accomplish these objects, to bleed at the onset of the attack most freely; it would be almost criminal to stop the flow of blood until your patient exhibited symptoms of faintness; and as soon as he rallies and the pain returns, the operation should be repeated until syncope is again produced. At the same time you would prescribe a liberal dose of calomel and jalap, so as to act freely upon the bowels, and afterwards the tartarized antimony in sufficient quantity to maintain a state of decided nausea. You would also freely scarify the conjunctiva;—having selected for this purpose the instrument previously described (page 63), draw it firmly and steadily along first the sclerotic and afterwards the palpebral portions of the conjunctiva, at distances of half a line from each other, taking care to divide the texture of the conjunctiva at each sweep of the knife, so as to penetrate as far as the fluid effused into the subconjunctival cellular membrane.* After you have completed the scari-

* Astruc in his review of Camerer's *Dissertatio de ophthalmia venerea*, makes the following statement. "Ad curationem ait operatione citâ opus esse, quâ "Chirurgus lanceolâ chirurgicâ conjunctivam tunicam prope corneæ transparentis marginem circularem incidit, et exitum virus parat, quam incisionem tandiu in circulo quasi continuat, donec nulla amplius infarcta hœreat virulenta materia. Quod tamen vix sufficit in Ophthalmiâ gonorrhoicâ graviore, in quâ necessum est conjunctivam morbosam non incidere modò sed etiam penitus excindere, ut alibi diximus." The following is the statement to which he here refers, and it is contained in the first volume of his learned work *De Morbis Venereis*. (Liber iii. Cap. iii.) "Una tantùm

fication of the conjunctiva, the eye should be bathed with tepid water and the lids separated so as to encourage the bleeding from the divided surfaces. In addition to these measures, you would direct that the eyes be frequently bathed with the alum lotion (two or more grains of alum to the ounce of water), you would advise the exclusion of light from the eye, and limit the diet to mild fluid aliment.

Having, by the early employment of these measures, subdued the acute symptoms, that is, having diminished the redness and swelling of the conjunctiva, and lessened the pain, and removed the sense of tension of the globe, you would proceed to apply a quantity of leeches just beneath the tarsal margin of the lower eye-lid, and direct the application of a blister between the scapulæ. Lastly, it may be necessary to use tonic and stimulating lotions and applications to lessen the distended state of the conjunctival vessels, and to contract the loose flabby condition of that membrane; and it may be also necessary to employ a restorative regimen to reinvigorate the reduced powers—

superfuit medenda via, scilicet circularem tumentis conjunctivæ ambitum ex toto excindere et extirpare, ne qua compressionis causa reliqua esset, unde oculis malè haberet."

"When (says Dr. Edmonston) the fleshy excrescence (chemosis) shews no disposition to resolution, and advances on the cornea, a portion of it should be removed by the scissors." See his remarks on the treatment of gonorrhœal ophthalmia, p. 281.

"In metastatica ophthalmia præter hydrargyrosim expedit materiem virulentam in textu celluloso scleroticæ et palpebrarum collectam levibus incisionibus utriusque membranæ evacuare; exit autem ichor gonorrhoica persimilis, observante Ill Nicolai et Camerario. Illam scarificationem ineunte hydrargyrosi instituere satius puto, quàm ipsi præmittere, ut docet Camerarius." Sauvages, *Nosologia*, &c., Tom. 2. p. 65.

"It is necessary also to evacuate the virulent matter, collected in the cellular texture of the sclerotica and eye-lids, by slight incisions of each membrane: an ichor, very like that of a gonorrhœa, will be discharged." Chandler, *Treatise on the diseases of the eye*, &c., p. 141.

"Quant à la resciision de la conjunctive, je puis assurer qu'elle est très-utile dans le cas de *chemosis* par ophthalmie de cette nature (gonorrhœal), comme dans les autres." Scarpa. Léveillé's translation, T. 1. p. 217. This practice is also sanctioned by Richter and Beer.

to place your patient in that state of vigorous health from which the activity of treatment has removed him. I know that some persons of tender feeling, have been shocked at the idea of saving an eye, by means of the large bleedings you will often find it your duty to practice in strong plethoric subjects, in whom this disease in its severest form may have taken place, but your conscience and your patient also will more readily forgive you for producing an ephemeral condition of feebleness than for permitting him to retain his strength at the sacrifice of his vision. Mr. Travers humorously cautions surgeons against the unnecessarily free detraction of blood in ophthalmic diseases, and I have already endeavoured to point out the circumstances which would regulate your practice in this respect; —the quantity of blood to be removed must be determined by the urgency and the other circumstances of each case. If you will persist in determining beforehand the amount of the circulating fluid to be always abstracted, in the hope of subduing the malady by withdrawing any fixed number of ounces or pounds, you will often commit the error which Mr. Travers condemns, or otherwise leave the disease to pursue an uninterrupted course. The difference in the severity of the symptoms, and the varied capacities of different individuals to be influenced by the loss of blood, must in this case, as in other instances, be taken into consideration, for the loss of twenty ounces of the vital fluid would be certain death to one person whilst it would only slightly affect another. Perhaps I cannot do better than quote Mr. Travers's observations upon this subject. "When (says this gentleman) I hear, as I often have heard, of sixty and seventy ounces of blood taken at one time for an ophthalmia, and this followed by repeated smaller bleedings, I must protest against the necessity for such a practice, and say with Falstaff, "the better part

of valor is discretion." As however there can be no discretion in allowing your patient to lose his eye-sight for the want of losing that amount of blood which is necessary for the cure of his disease, and the removal of which his constitution is well able to bear, it is not intended to apply the word *discretion* to inadequate and inefficient treatment. There is one important rule to which in cases such as these you must ever be attentive—bleed your patient in the erect position, and allow the blood to be discharged as rapidly as possible from a large orifice, and do not check its flow until the most unequivocal indications of syncope present themselves; twenty ounces of blood withdrawn under these circumstances will be of more service than twice that quantity slowly abstracted at short intervals, your patient being in the recumbent or sitting posture, and not even complaining of faintness during or subsequent to the operation. You will readily understand the distinction to which I am anxious to direct your attention, by reverting to the state of the circulation in the surface of the body during the existence of syncope, and by taking into consideration the capacity of blood vessels to resist distension, when, having been only recently and for a short period distended, they are permitted to reacquire their original and natural magnitude.

You will more clearly understand the mode of treatment it is my wish to recommend for the removal of the most acute form of this disease, by the relation of a case which recently fell under my care.

A stout young man, the relative of a medical friend, called upon me at nine one evening, complaining of uneasiness in the right eye, he said it felt as though sand were beneath the lids, and he requested me to examine his eye for the purpose of removing these particles of sand; but, although I did examine the eye most carefully, I really

could discover scarcely any thing at all the matter, and therefore merely directed him to bathe the eye with goulard water, and to take a dose of purging medicine. I was sent for very early on the following morning, and was surprised to find the conjunctiva and eye-lids somewhat red and tumid, and a slight puro-mucous secretion adherent to the tarsal margins and lodging upon the conjunctiva. He told me that his eye had been extremely hot and painful during the night, that the sensation of sand beneath the lids of which he complained the previous evening, had much increased, and that the light was painfully annoying to him. Of course I directed him to be bled very freely, to take some active purging medicine, to keep the eye cool with goulard water, to exclude, in a great measure, light from his apartment, to put a blister at the nape of the neck, and to abstain from animal food and strong liquors. Now, I did not, even at this period, suspect the disease to be what it really was, for many reasons, but chiefly because it was improbable that he had exposed himself to the risk of contracting the gonorrhœal inflammation. However in the course of that day, the symptoms became fully developed, and the nature of the case was sufficiently evident. The bleeding in the morning amounted to twenty ounces, but the symptoms had notwithstanding rapidly increased. Directing this gentleman to assume the erect position, I freely opened a large vein in the arm, and by the time sixteen ounces of blood were rapidly withdrawn he became so faint that it was necessary to close the bleeding orifice; that no time might be lost I ordered from fifteen to twenty leeches to the lower lid, and prescribed for him a nauseating mixture (a dose of which containing a quarter of a grain of tartarized antimony he was directed to take every hour) and the other remedies to be continued, except that the alum lotion was substituted for the goulard water. As

the chemosis was considerable, so great that only a small portion of the central part of the cornea could be seen, I freely scarified the tumid conjunctiva, and as the upper lid was of a dark-red colour and much swoln, a few punctures were made into its cellular membrane with considerable advantage, with the advantage, I think, of preventing sloughing or extensive suppuration of that part; indeed, one of its distended veins was unintentionally divided, which bled rather copiously, and much relieved the tension and tumefaction and vascular congestion of the palpebra.* Now, although this treatment seemed to arrest the progress of the disease, it was necessary to repeat the bleeding late in the evening of the same day, in the same manner and to the same extent as before, and I then regretted that, calculating on the effects of my previous measures, leeches had been applied so early, on account of the increased advantage which the patient would have derived from their application after the force and activity of the circulation had been still further reduced by venesection. However this patient recovered with an extensive opacity of the cornea, after having lost, in the short space of twenty hours, sixty ounces of blood besides being reduced by various other means.

You will learn from the recital of this case, the absolute

* This is a very excellent plan in such cases, for we obtain the blood from a part actively co-operating with other symptoms, in aggravating the patients unpleasant feelings, without much interfering with the quantity of that fluid in active circulation; for the vessels of the lid, under such circumstances, are prevented fron contracting upon and urging forward their contents owing to their extreme distention, but as soon as that state of vascular plenitude is lessened, they contract on their contents, their tonic and elastic properties return, and unless redistended by the continuance of the severe symptoms (which treatment if correctly conducted will prevent) they will not afterwards yield, to an equal extent. Besides, in this way we avoid the risk of sloughing and suppuration of the eye-lid, an accident which whether the patient's vision be restored or not, will occasion great deformity and probably much suffering.

necessity for prompt amd active treatment, when this disease occurs in its most acute form; the nature of the remedies to be employed; and the order in which they ought to be used.

On the subsidence of the chemosis it will sometimes be found that a considerable lymphatic deposition exists between the lamellæ of the cornea. There appears to be a stronger disposition to the formation of matter in this situation in these cases than in any of the acute affections I have yet described. When a large quantity of matter or deposition exists, it has been suggested to puncture the cornea more or less extensively and to discharge it,* under an impression that this mode of procedure was essential to the preservation of vision. I believe this advice to be very improper. If the cornea be divided, staphyloma or sloughing of its texture is almost sure to take place, and besides, no large quantity of the matter can be discharged, for it is extensively infiltrated and much diffused, and for the most part, too consistent to flow readily about, and is disposed, from its tenacity, to adhere to surrounding parts.

* "J'ai pu avec raison accuser autant l'obstination des personnes chargées de la santé des malades, que la timidité de ces derniers, qui se refusaient à l'incision de la cornée qui seule pouvait arrêter les progrès de l'hypopion." WENZEL, *Dictionnaire Ophthalmologique*, p. 497.

"The incision of the cornea to evacuate the extravasated matter should be made in the beginning of the complaint." SWEDIAUR, p. 246.

BANISTER in his remarks on the treatment of the effusion of purulent matter within the lamellæ of the cornea and the chambers of the eye, has recommended, in his peculiarly quaint language, the same operation. He says, (first alluding to various preliminary measures), "if all these medicines heale it not, but still the eye is full of matter fast remaining there, then must you come to attempt this course and way: Let the patient bee set conueniently, hauing one to stay his head: let the Chirugian hold his Eye with one hand, with an instrument called *speculum oculi*, of which you may see the description and picture in AMBROSE PARE, and with the other hand with the poynt of a launcet, he shall finely and cunningly picke the horny membrane, vntill hee come to the slimie matter, which by little and little shall be auoyded" Chap. xii.

If matter be extensively effused between the corneal lamellæ, if the chambers of the eye are filled with the same effusion, if death or staphyloma of the cornea and suppuration of the eye-ball appear to be inevitable, and if there be acute pain of the globe with a sense of tension of that part, then an opening may be made in the cornea,* but it will not be expected, under such circumstances, that it, or any other means which may be adopted, will have the effect of restoring vision.

The object of such treatment is *chiefly* limited to the relief of suffering by removing tension, and if one eye

* It has been suggested that the effused matter produces irritation by its own reputed virulence, and hence it may be discovered that in looking over the works of various old authors, they speak of the puro-lymphatic matter which often occurs in the chambers of the eye and between the lamellæ of the cornea during the progress of gonorrhœal ophthalmia, as a *yellowish ichor*, &c.; and recommend its removal under an impression that it is injurious to the parts it touches, by its corroding and other mischievous properties. I have taken a totally different view of the subject (see text), and feel assured that the injury inflicted upon the cornea is occasioned almost altogether by the pressure upon, and absorption of, its lamellæ, and by the impaired nutrition of its laminar structure from the derangement or death of that tissue in which its supporting vessels ramify; whilst the effect produced upon the parts beneath, when the effusion takes place to a great extent in the chambers of the eye, are pressure upon the iris and tension of the globe.

The evacuation of the matter sometimes effused within the chambers of the eye during the course of this acute disease has been recommended, as I have already pointed out, from a conviction that it was of a purely gonorrhœal nature, and that it possessed irritating properties, which do not belong to ordinary and healthy pus. The gonorrhœal character of the pus so effused is indeed distinctly mentioned by Benedict, as well as by the various authors whose names I have mentioned in connection with this subject at an earlier part of this *section*. (page 180.) Benedict, in the course of his observations *De ophthalmia syphilitica*, has made the following statement, which sufficiently explains his own views as to the contagious characters of the secretions contained within the globe of the eye. "Cornea, uti nos omnes scimus, composita est ex laminis, quarum interna superficies lympha tenui et aquosa tecta cernitus. Loco hujus lymphæ tenuioris et pellucidæ mucus nunc secernitur purulentus atque ejusdem naturæ, cujus est in externa conjunctivæ superficie. Una et conjunctiva corneæ inflammatione correpta simili modo mucum flavescentem excernit." §. 498.

alone be affected, it will have the additional advantage of diminishing the sympathetic irritation it is then sure to sustain in a greater or lesser degree.

Some writers appear to believe that mercury has a good effect in these cases from an idea that they bear a certain analogy to constitutional syphilis; but even presuming this notion with regard to the nature of the disease to be correct, it is scarcely possible to affect the constitution with this remedy with sufficient rapidity to prevent the loss of vision.

Many surgeons recommend the local stimulant plan at an early stage, but as my experience inclines me to give a contrary opinion, I cannot recommend this plan of treatment; and I beg it to be understood that I have given this mode of treating acute gonorrhœal ophthalmia in its early stages many trials, with every disposition to adopt the practice generally, if it had been found to answer the purpose for which it was employed. Of course my observations only apply to the use of strong local stimulants at the *onset* of this disease, for there can be no doubt respecting their utility when all active inflammatory symptoms have subsided. It does certainly appear to me that an acute inflammatory disease of the eye, prompt in its development and rapid in its progress, attended with a great degree of chemosis (the continuance of which is very apt to produce strangulation of the superficial nutrient vessels of the cornea), cannot be effectually subdued or removed by any local application whatever; more especially when it takes place in the strong and plethoric, in those whose circulation is forcing into the dilated and distended, and consequently weakened, vessels of the eye, a quantity of blood so considerable as to prevent them from effectually contracting upon and urging it forward.

In giving such an opinion with regard to the use of

powerfully stimulating remedies at the early or during the severe stage of gonorrhœal ophthalmia, I am by no means anxious to dispose you to neglect the evidence which has been brought forward in favour of the practice, and particularly that which has been advanced by Mr. Guthrie. I apprehend however the gentlemen who report his practice in various Medical Journals, ascribe to him a stronger predilection for the use of strong stimulating remedies in ophthalmic affections than he really possesses. I cannot really believe that he uses the *unguentum nigrum* so indiscriminately as might almost be inferred from perusing the *Reports of the Westminster Ophthalmic Hospital* recently published in the *Medico-Chirurgical Review.*

As soon as the acute symptoms are decidedly diminished by bleeding and the other remedies already mentioned, the discharge lessened, and the tense florid condition of the conjunctiva superseded by a palish flabby state of that membrane, I am in the habit of using with advantage a strong solution of the nitrate of silver, or the unguentum argenti nitratis, prepared according to the following formula:—

℞ Argenti nitratis, gr. ij.; Liq. plumbi subacet., gtt. viij; Ung. cetacei, ʒj. Misce.

[The nitrate of silver should be reduced to an impalpable powder in a glass mortar, and carefully and accurately mixed with the spermaceti ointment.]

Mode of using the ointment.—Take a little of the ointment upon the blunt extremity of a probe, and having raised the upper lid from the globe, smear it upon its mucous surface. Direct the patient to keep the palpebræ closed for half an hour, and then to bathe the eye with a little tepid water.

Baron Dupuytren strongly recommends the insufflation of calomel once or twice a day, and he also advises that

the liquid laudanum of SYDENHAM be dropped into the eyes every night, and he states that by the use of these means, with various *subsidiary* agents,* his treatment of gonorrhœal ophthalmia is very successful. BENEDICT is also very partial to the use of laudanum in all cases of ophthalmo-blenorrhœa. After having recommended the addition of a little laudanum to a collyrium to be employed in ordinary cases of this nature, he observes, " semel aut in casu graviore bis in dies laudanum purum oculo affecto penicilli ope illinatur." (§ 322.)

Sometimes when the disease has not been attended to sufficiently early, or has not been treated with sufficient activity, there remains a chronic state of disease which is very troublesome, and by no means easily cured. Attention to the state of the bowels and to the diet, the use of zinc lotion, or a weak solution of the nitrate of silver applied to the eye, with the occasional application of blisters to the temples and to the forehead, comprise that plan of treatment which has been most successful in my own practice in the management of such cases.

The chronic states of disease, (and particularly the thickened, vascular and unequal condition of the surface of the conjunctiva,) sometimes consequent on acute gonorrhœal ophthalmia, do not materially differ from those resulting from the severe form of simple purulent ophthalmia of infants and adults, and their treatment is, for the most part, regulated by the same principles and composed of the same measures. When the conjunctive membrane is affected in the manner I have just described, and secretes a pale, glairy, tenacious, gleety sort of fluid, it is desirable to evert it, and after having cleansed it with a

* The adoption of depleting measures he considers to be *merely accessory* to the local plan of management I have just mentioned.

sponge, apply to it, by means of a small soft brush, a solution of the nitrate of silver (five grains to the ounce of water). This may be done every evening, provided the application of the remedy does not excite continued pain, or give rise to any other injurious effect which would render it improper to continue its use.

It is by no means unusual for poor persons to request our advice under the following circumstances. They have perhaps suffered from gonorrhœal ophthalmia for several days, and unconscious of the destructive tendency of the malady they have merely attempted to check its progress by the use of some trifling eye-wash.* We generally find them, under these circumstances, very pale, with a countenance indicative of extreme exhaustion and suffering. The eye-lid is enlarged and of a dark red colour, but its surface is somewhat wrinkled, as though it had been recently very much distended; it is not smooth, and polished, and tense, as it was at an earlier stage of the complaint. A little matter may be seen at its edges and entangled among the eye-lashes. The cornea is flattened, a ragged opening exists at or near its centre, to which a quantity of lymph is adherent; this lymph is usually present in a considerable quantity, and may be freely moved about by passing the lid upon the eye-ball, except at

* Although it is possible I may not be able to communicate a clear idea, and exhibit a distinct view of the local and general phenomena which are presented by persons who have just sustained suppuration of the eye-ball from the previous existence of gonorrhœal ophthalmia, I am so well acquainted with them myself, from repeated and attentive observation, that I can generally correctly determine the nature of the case when it is presented to my notice at this period, even before I have made a single inquiry or at all investigated its history. Even where bleeding has not been employed, the pale and exhausted appearance of the patient is pretty well marked, and appears to be produced by the extreme severity of the suffering he has sustained. The case is, in short, very distinctly characterized by many and various decided symptoms.

that point where it is fixed to, or grasped by the corneal aperture. There is a good deal of interlamellar deposition of the same description at those parts of the cornea which immediately surround this aperture, and also in the parts beneath. The eye-ball is probably diminished in size, and the lens may or may not be evacuated.* It is evident that the existence of this state of things necessarily involves the loss of vision; but are we, on this account, to do nothing whatever for the eye? If no proper measures be now adopted, staphyloma will occur in the eye which is already injured, and the opposite organ (which I have hitherto presumed to be healthy) will become irritable, painful, inflamed. If then no active inflammation be present, it will be desirable to recommend the zinc lotion to be used four or five times a day; to remove any long straggling portion of lymph which may be attached to the

* I trust I shall not be considered tedious if I very briefly explain the cause and progress of the symptoms to which I have just adverted in the text, and also the condition of parts which remains on their subsidence. When the inflammation extends from the conjunctiva to the cornea, the iris, and the inner membranes generally, pus is secreted, the cornea, which is at the same time diseased, is penetrated either by ulceration or sloughing, or it may burst by the action of the muscles of the globe, and in either case the contents of the eye-ball are discharged and suppuration of that part is said to have occurred. I am desirous to explain that the tendency to the secretion of pus on the part of the inner and deep-seated serous textures of the eye, is very great whenever they become inflamed during the progress of gonorrhœal ophthalmia, and that when this has occurred, when the affection has proceeded to this extent, the serous textures which secreted the purulent matter become absorbed, so that the small tubercle which remains is not, by any means frequently, found to contain the choroid, the retina, and the ciliary processes; dissection proves that an imperfect remnant of the iris and a mass of fibro-cellular tissue (the characters of which will be particularly explained when I treat of suppuration of the eye-ball) alone remains. The matter which is formed in suppuration of the eye-ball consequent on gonorrhœal ophthalmia and that which is secreted when the same occurrence succeeds syphilitic iritis, very rarely indeed possess the same characters; the matter in the former case is yellow, quite fluid and possesses no distinct adhesiveness, in the latter instance it is much paler, much more consistent, and somewhat tenacious.

cornea, by means of the small hook and the curved scissors; and to drop upon the corneal aperture a solution of the nitrate of silver (in the proportion of about three grains to the ounce of water). By the adoption of these simple and apparently trifling measures, and by the employment of counter irritation in the neighbourhood of the disease, &c., we may reasonably hope to prevent all further injury. Collapse of the eye-ball is as favourable a termination of such a case as we have a right to expect.

Some cases of gonorrhœal ophthalmia will be so mild in their character that they will not require any approach to the activity of that treatment I have represented to be necessary when the symptoms are of an acute nature, so that in this affection, as indeed in every other, the activity of treatment must be regulated by the severity of the symptoms such treatment is intended to remove. In many cases of the slight or mild form of gonorrhœal conjunctivitis nothing more will be required for their cure than the use of a little alum lotion, a blister to the back of the neck, and the administration of a few doses of purgative medicine, with a moderated diet.

On concluding my remarks on those forms of conjunctivitis which are attended with decided purulent secretion, it may be right to mention, that the precise pathological condition of the conjunctive membrane, at an early period of these affections, is pretty much the same in all of them;—the minute glands which usually secrete the fluid which lubricates the surface of the conjunctiva are engaged in elaborating and pouring out pus, and it would appear that in at least two of these varieties of disease, the infecting agent is not infrequently applied, in the first instance, to the orifices which proceed from the small glandular bodies in question. The direct transmission of the morbid agent qualifies it to act with full and unimpaired virulence upon the parts which receive it.

SECTION VII.—PUSTULAR OPHTHALMIA.

Syn. *Pustular inflammation of the conjunctiva.—Conjunctivitis pustulosa.—Ophthalmia phlyctænodes.—Ophthalmia pustulosa.*

Pustular ophthalmia is another form of conjunctival inflammation—it is an inflammatory affection of the conjunctiva attended with the formation of pustules in some part of the anterior surface of the eye-ball.

We know that children of a defective constitution, whose eyes are affected with that form of ophthalmia termed strumous, are very liable to the formation of pustules either upon the conjunctiva or the cornea, but that is not what I am now considering—it is an inflammatory affection of the conjunctiva, not necessarily connected with the ordinary indications of struma, to which our attention is now directed.

Pustular ophthalmia most commonly occurs in children, but it will not infrequently be witnessed in the adult, and it more commonly affects women than men. It is characterized by partial redness of the conjunctiva—the redness is not equally and generally diffused throughout the whole surface of that membrane, on the contrary, the vessels proceed in distinct fasciculi, generally running in a direction nearly parallel to each other, not interrupted by diffuse ramification, but pursuing a direct course until they terminate in a pustule; more generally this takes place at the margin of the cornea, sometimes before they reach that part, and occasionally their course is continued for some distance upon it, where they terminate in the same manner—that is, at the margin of a pustule. There is seldom any considerable intolerance

of light, or any great general vascularity, or any material extension of the inflammatory action to more important and deep-seated parts; frequently however there is a succession of pustules, a fresh one every now and then arising as the original ones disappear, or as they are healing and subsiding. Sometimes, as Mr. TRAVERS has remarked, a pustule may be noticed at opposite sides of the cornea, nearly in its transverse diameter; but they are very variable in this respect, and also in their size, their number, and many of their other characters.

With regard to their seat I may mention that they most generally form at the margin of the cornea, although they may often be seen on the sclerotic portion of the conjunctiva at some distance from the cornea, and occasionally they will form upon the centre of the cornea itself, or indeed upon any portion of its superficies. However they do not actually implicate either the sclerotica or the proper substance of the cornea, unless their size is unusually considerable, but are first formed in the cellular membrane, connecting in the one case, the conjunctiva to the sclerotica, and in the other, the mucous covering of the cornea to its primitive or anterior layer. Such is the structure in which they originate, and such is the situation they occupy, subject of course to many of the same variations and exceptions to which various other morbid productions are obnoxious.

Their size too is very various; there may be one or two large pustules, or there may be a considerable number of small ones, even to the amount of ten or twenty, and when this happens they are generally placed around the border of the cornea. I have never yet seen a case in which there existed so large a number, where one or more of them did not form in this situation. Several of these small pustules often exist around the margin of the cornea in

children, giving rise to an appearance *as though it were set with pearls;* generally speaking, their size and number are in an inverse ratio with respect to each other; if the number be considerable their size is small, and *vice versa.* Sometimes when only one pustule is present, it may be as large as the half of a small pea, (I have even seen them larger than this) presenting an extensive ulcerated surface which, on healing, has left behind a cicatrix, and thus produced, for a time, an inequality of surface very injurious to the delicate organization of the eye.

With regard to the characters of the pustules themselves, I may state that, when upon the cornea, they appear like small red conical elevations, but when in other parts their colour is white with sometimes a shade of yellow; if large, they are flatter, much less prominent certainly than when they are small; they are generally circular, as might be expected, for the effused fluids pressing equally on all sides would of course cause the tissue in which they are deposited to yield in every direction to the same extent, unless indeed when a pustule happens to be situated close to the margin of the cornea; then the strict adhesion of the conjunctiva to that part prevents it from yielding so readily as in other situations, and we have consequently a crescent-shaped pustule produced, the convex margin of which is situated towards the periphery of the globe, and its concave edge towards the cornea. But if it form at some little distance from that situation, it may still spread equally in every direction, and preserve its circularity; that is, if it do not approach quite to the edge of the cornea, for then, of course, being prevented from extending in that direction, its contents would be forced along its margin, and the pustule would on this account acquire a crescentic appearance; in fact, the same rule obtains here as in the formation of a

phlegmonous abscess. If pus be deposited in certain situations in the cellular membrane beneath the skin, it will press equally on every side, but the skin in front and the fascia behind will not yield so readily as the cellular membrane, the pus therefore compresses that tissue in the lateral direction, and if it be healthy it yields equally to the compressing force, and in this way the cavity of such an abscess will acquire a circular border. However this rule is interfered with when the cellular membrane is unhealthy, has acquired morbid adhesions, or if it have obtained a more intimate connexion in one situation than another, or be of a more unyielding quality; these events are generally determined by the situation of the abscess and the state of the part previously to its formation. If a fluid extend from a given point to an equal distance in every direction, its boundary must necessarily possess a circular form.

The contents of these pustules vary in their qualities; sometimes the fluid matters they contain are watery, when, as Beer remarks, they ought properly to be called *phlyctenulæ;* more commonly they are puriform, or they contain a substance possessing mixed characters, at one time *serum*, at another *pus*, and at a third *lymph* predominating. The contents of the large flattened pustule, situated generally at some little distance from the cornea, are less fluid than any other, and in some instances would seem to be little more than a layer of lymph, which is so placed upon the part as to give it a *lardaceous* appearance.

These are all the observations I wish to offer respecting the visible characters of the pustules, but it would be well to make a few inquiries in reference to their mode of origin. What, for instance, determines the formation of pustules in preference to the more usual products of conjunctival inflammation? Some will say that it is in

consequence of the connexion subsisting between it and scrofula, but I have discarded that opinion because there is not the intolerance of light noticed in the latter disease when it affects the eye, and further, because it sometimes occurs in persons advanced in life who do not appear to possess the characters and symptoms of scrofula.* You will remember that the conjunctiva is a continuation of the common integument of the eye-lids, and that it is a part very much disposed to suffer from or sympathize with various cutaneous maladies, whether they be of a local or constitutional nature;—for example, erysipelas, scarlet fever, measles, and small-pox, are very often attended with a corresponding affection of the conjunctiva, at least, with an irritable and inflamed state of that membrane. Now, the skin is liable to the formation of pustules, papulæ, and so on; sometimes the cutaneous follicular ducts become obstructed; or the discharge they transmit is increased in viscidity and accumulates and distends them, producing when slight, what WILLAN and BATEMAN term *acne simplex*, or the *acne punctata*. It may be imagined that a somewhat similar state of things may take place in the conjunctiva, the points from which its secretion takes place,—whence the puriform secretion is discharged in purulent ophthalmia—become obstructed or closed; at the same time the conjunctiva may be the seat of erup-

* Increased lachrymation, which is always present in scrofulous ophthalmia, is sometimes associated with the pustular variety of the disease. But in the instances in which it occurs it would appear to be owing to the inequality of surface the pustule or pustules produce; the lachrymal gland being thus excited to augmented action pretty much as in the case of foreign bodies which are situated beneath the palpebræ. This increased lachrymation is, on this account, more likely to take place, and is accordingly more frequently witnessed, when the pustules are placed at the upper part of the eye-ball, so as to be very distinctly exposed to the friction of the eye-lid in its movements upon the surface of the globe.

tions from constitutional causes, just as the skin becomes blotched and eruptive from mere disorder of the alimentary canal. There is another mode in which in my opinion it may take place, I allude to the sudden check or arrest the blood receives when passing along its vessels at that part where the conjunctiva becomes extended over the cornea. The connexion of the conjunctiva with the cornea is of the most intimate description, by no means so loose as that subsisting between the conjunctiva and sclerotica, and it may be supposed that the check the blood receives at that point may cause that amount of accumulation—that degree of vascular fulness—which may give rise to the subsequent effusion. The accuracy of this explanation is the more probable inasmuch as such pustules generally form at the circumference of the cornea, where this check, this arrest of the circulation, will be always most constant and most considerable; however it will not explain the formation of pustules in other parts of the conjunctiva and the cornea without a very constrained mode of reasoning; and the correctness of my explanation of the occasional cause of the formation of these pustules, is of course so far questionable.

I have frequently and carefully watched the origin, the progress, and the termination of pustules which have formed *upon the cornea*, and have arrived at the conclusion that they are produced only in two modes. In the first place a quantity of serum or pus is deposited immediately beneath the conjunctival covering of the cornea, the surrounding textures are condensed by its pressure, and there is thus formed a circumscribed cavity containing the one or other of these fluids. By the use of proper remedies or under the influence of the unaided efforts of nature, this deposition may be absorbed, and the cavity containing it may become obliterated by the re-application of the

conjunctival covering of the cornea to its primary layer. If the deposition continue, if a larger quantity of matter be effused, then the external membrane may be much elevated and extensively separated from the first lamina of the cornea; and if the matter be not discharged, absorption of the corneal layers may take place, but it more commonly happens that the morbid effusion is evacuated by an external opening. The extent to which the conjunctival covering of the cornea may be separated from the parts beneath without leading to any permanently consequential injury will be particularly pointed out when I speak of the *diseases of the cornea.* The other mode in which pustules form in this situation is somewhat similar to that I have just represented except that the deposited matter, which is the first indication of this affection, is firmer, there is in fact a small consistent elevation, a sort of pimple, which eventually softens, or it would in some instances appear that a quantity of fluid matter is deposited in its centre,* and that the more indurated texture was expanded and formed a cavity, by its extension, in the centre of which the fluid matter was contained pretty much as a kernel is surrounded by its shell.

If the inflammation be not arrested, if the pustules spread, very severe mischief may occur; for the irritation produced by the prominent pustules upon the eye will, in some subjects, give rise to a great amount of inflammation, an irritation and inflammation almost as severe as that occasioned by the introduction of a foreign body beneath the lids.

* When it was more the custom than it is at present to open these pustules, I had frequently an opportunity of observing that only a minute quantity of fluid was discharged, by the operation, from a cavity, the walls of which were firm and vascular. This remnant of the pustule was in every instance absorbed very slowly.

If the pustule on the cornea extend, it may destroy its laminar texture and eventually produce an opening through which the aqueous humor may be evacuated, and the iris prolapsed; or it may form a disagreeable ulcer of the cornea; or it may leave behind an opacity of that part. When a large pustule forms on the conjunctiva, and afterwards ulcerates, it may, when healed, give rise to puckering and contraction of that membrane, the cicatrix may be hard and unequal, quite different from the soft smooth surface of the healthy conjunctiva, and there may remain, in consequence, a disposition to inflammation of that part—there may remain, as a result of this state of the conjunctiva, a most troublesome form of chronic ophthalmia.

When a pustule forms upon the cornea it may be extremely prominent, it is not generally so diffused, it does not possess so broad a base, as when it forms upon the conjunctiva, in consequence of the stronger adhesion subsisting between it and the primitive corneal layer; it may then occasion great irritation, just as any other substance destroying the smoothness of the surfaces which move frequently upon each other, would be likely to produce. If its contents continue to increase and its covering does not give way, it will extend backwards, producing, by its pressure, ulcerative absorption of the neighbouring layers of the cornea, and by implicating the interlamellar cellular tissue, will likewise occasion sloughing of that part; in this way it may destroy the whole of the corneal layers for a limited extent, thus forming a fistulous opening into the anterior chamber, leaving behind, if the mischief do not extend laterally beyond a certain distance, a troublesome ulcer and of course some degree of opacity. It may be observed that this loss of the corneal structure may depend either on a process of gangrene, or of progressive or ulcerative absorption.

If a pustule forms upon the cornea, it may permanently destroy the equality of those surfaces which naturally glide upon each other with the most perfect freedom and exquisite precision; and if very large, it may cause the conjunctiva to be closely applied to the sclerotica beneath it, and thus interfere with that pretty extensive motion of which these parts admit in their normal condition.

Mr. Lawrence and Mr. Travers consider *pustular* separately from *strumous* ophthalmia, and you will perceive their arrangement, so far, agrees with the one I have adopted, but Beer and Mackenzie, and some other writers on diseases of the eye, have connected it with struma ;* the formation of pustules at some part of the anterior surface of the eye-ball is, according to the last men-mentioned authorities, merely one of the occasional accompaniments of strumous inflammation of the conjunctiva; however, although it occurs more generally in children, it also takes place at all periods of life, and in persons who are not certainly of a scrofulous constitution in the ordinary acceptation of that term.

Pustular ophthalmia is not generally attended with any important constitutional disturbance; there are occasionally present symptoms of gastric and intestinal derangement, and there may be sometimes slight febrile disturbance, but very frequently patients will not complain of any constitutional irritation whatever, so that in many instances we have to do little more than treat the local malady.

There are many external sources of irritation which I have had reason to believe give rise to pustular ophthal-

* "Soar Eyes are frequently a species of the Kings-Evil, and take their beginning from vicious Humours inflaming the Tunica adnata, which increasing doth also sometimes affect the other Tunicles, as the cornea, &c. with great pain, tension, pulsation, &c., whence *Pustulæ* arise and suppurate, terminating for the most part in Ulcers." Wiseman, p. 313.

mia, such as fine metal dust and other particles floating in the atmosphere of a confined room, such as many artisans are exposed to; and I may add the use of gas, when employed without a proper attention to those circumstances which tend to moderate its heat and to steady and equally diffuse its light.

Parents are often alarmed at this disease in the eyes of their children; it appears to them to be very important and dangerous, and the pustule or pustules are in their opinion great blemishes, which they are very desirous of having removed from the eyes of their children; you can of course have no hesitation in assuring them of the perfect safety of vision, you may at once tell them, after you have satisfied your mind of the real nature of the disease, that the child will recover its vision perfectly and that the spot or blemish will entirely disappear.* In making this statement I am of course supposing that the pustule is small and has not degenerated into an ulcer, and is not attended with that affection of the deep-seated textures which we have represented as being an occasional consequence of the irritation excited by the presence of pustules upon the surface of the eye. I have often obtained great praise with little trouble for curing this simple disease,—the benefits of treatment have been clearly evinced to friends and patient by the disappearance of the pustules; and I suppose they have given me credit for taking away substances of a strange and terrible nature.

Treatment.†—As pustular ophthalmia has generally

* "Les pustules et les phlyctènes sont ordinairement de peu de durée, et donnent rarement des craintes, à moins que des applications nuisibles ne les fassent dégénérer." WENZEL. *Dictionnaire Ophthalmologique*, T. 1. p. 481.

† The treatment suggested by BANISTER, clearly indicates that the disease had generally been very manageable under his observation and

been controlled under my own observation by a very simple plan of treatment, I shall scarcely think it necessary to refer to the methods of others, whose peculiar views of the nature of the disease have modified the practice they have deemed it their duty to recommend for its cure.

If the patient's health be moderately good, if the symptoms be not unusually severe, and if the case fall under your care soon after the disease commenced, you would direct him to take a dose of some simple purging medicine, such as you might consider best suited to his habit of body; you would advise him to bathe the eye frequently with goulard water, and to drop upon the pustule every night and morning a solution of the nitrate of silver (about two grains to the ounce of distilled water). If the case be very obstinate you may deem it prudent to bleed from the arm, or to apply leeches to the lower lid, and afterwards to place a blister at the back of the neck. These means comprise all that is necessary to complete the cure in this class of cases; but if the pustule on the cornea be large, and if it be extending, your treatment would be more active, and you would deem it right to arrest, by the agency of mercury, that action which gave rise to the deposition, and also to promote its absorption. Extension of inflammation to the deep-seated textures would of course require the adoption of the same vigorous measures as disease of those parts arising independently of such extension of mischief; and the other consequences of the malady would engage attention on the ordinary principles—such, for instance, as ulceration of the conjunctiva and the cornea, and their consequences.

superintendence. He says, in his amusingly quaint style, "in the general cure the patient must be carefull to bee quiet, to beware of much light, to vse little speach, to keepe his belly loose." *Sec.* v. *Chap.* vii.

The patient may be teased with frequent relapses, and in such case it will be right to examine very particularly the state of his health, the nature of his employment, and to inquire into any other circumstance which you may believe or suspect to exercise an injurious influence upon the eye, and modify your treatment accordingly. If you believe it to be produced by disordered health, the rectification of such disorder will very properly occupy your attention; if from any source of external irritation, that irritation must be removed, at least for a time, or you may employ some mode of lessening its injurious influence. I have known a gentleman teased with frequent relapses of pustular inflammation of the conjunctiva from reading by a large gas-light which he had lately began to use in his study, and on discontinuing its use the disease ceased to annoy him. A young man was employed in filing metal, and when more closely engaged in his avocation than usual the eyes always became affected with pustular ophthalmia. If therefore the patient be teased with frequent relapses, make those inquiries which will be likely to elicit some information relative to their cause, and you may with scarcely any difficulty remove or prevent the occurrence of a disease which has for many years tormented him. In some of these cases the formation of an issue in the arm will be as necessary as in certain examples of frequently recurring scrofulous ophthalmia.

Sometimes it will be necessary to open a pustule situated on the cornea;* if the tunic covering it be unusually dense and do not readily give way, and if its contents are increasing, this measure will be advisable. Select a fine cataract needle, puncture the most prominent part of the

* "Si pustula remaneat, ea acu argenteâ pertundatur." Sauvages. *Nosologia Methodica*, Tom. ii. p. 70.

pustule, and evacuated its contents; the ulcerated surface will be then exposed, and will be managed as a simple ulcer of the cornea. I am not aware of any measure so likely to cure a *large* and obstinate pustule of the cornea, to prevent its extension, and to limit the degree of opacity it has a tendency to produce, as that I have just mentioned.

Many surgeons are in the habit of touching these pustules with the solid nitrate of silver, worked to a very fine point, and I believe this method was formerly pretty generally adopted—I shall only say of this practice that it is *always* painful and unnecessary, and very frequently mischievous.

In some cases which have proved unusually harassing under the use of the ordinary remedies, I have advantageously used the zinc lotion or the *vinum opii* made with sherry wine and a large quantity of the opium, and I have occasionally employed with advantage the strong nitrate of silver ointment. However, the disease is, for the most part, so manageable by the method I have pointed out, that I have seldom occasion to search after noval remedies. It is of consequence to bear in mind that the affection is very manageable—and that constitutional treatment rather than local applications constitute the most important means of cure.

SECTION VIII.—SCROFULOUS OPHTHALMIA.

Syn. *Strumous inflammation of the conjunctiva.—Conjunctivitis scrofulosa.—Ophthalmia scrofulosa.*

Before entering upon the consideration of strumous inflammation of the conjunctiva, I shall, for a short time, direct attention to that state of constitution, which, either

from hereditary taint or acquired predisposition is capable of producing those local ailments, either with or without any discoverable exciting cause, which are commonly termed scrofula.* In order that I may be the better understood I shall explain somewhat in detail, what is meant by the local evidence of scrofula; and why that disease may at one time appear with, and at another period without, any obviously acting exciting cause; and also what are the indications of an acquired, in contradistinction to those of an hereditary predisposition to scrofulous action.

If the cervical glands of a child become slightly enlarged, independently of the infliction of a blow, or of any external injury or palpable source of local irritation; if that enlargement continue to increase very slowly and gradually; if at length the skin become red and attenuated, and there be an indistinct sense of fluctuation; and if, on making an opening at the most prominent point of this imperfectly suppurated gland, the discharge be of a clotted or curdy character, it would with perfect propriety be said that such a succession of events constituted one of the local evidences of scrofula; and the disease itself would be termed strumous inflammation of a gland terminating in suppuration of a strumous quality.

Or, if the upper lip of a child become enlarged under the same circumstances, its tegument puckered and husky, and its mucous membrane thickened, and if it continue to increase without evincing a disposition to undergo any other change, except thickening and induration, such a condition of the lip would be considered to present one indication of the existence of scrofula in the system. We are familiar with this state of the upper lip in strumous

* The following remarks on scrofula are intended to apply, not merely to strumous conjunctivitis, but to all the forms of scrofulous disease of the organ of vision to be subsequently discussed.

children, and must frequently have noticed the awkward and disagreeable appearance it produces.

It will sometimes happen that a child known to possess a strumous constitution, shall be guarded most cautiously from atmospheric influence and live according to the properly prescribed rules of his physician, but, in spite of all his skill, and every care the affection, and every comfort the wealth of friends can provide, he will become consumptive; the constitution will be too fully imbued with the *scrofulous principle* to be permanently protected, by any hitherto ascertained means, from its ravages. But in many of these cases no such care will be taken, no such comforts provided, and an accidental and improper exposure to the influence of cold, may induce the softening of the pulmonary tubercles (which in both these cases we have presumed to be present,) and in this way abbreviate an existence, which, under different circumstances, might have been prolonged for many years. These two supposed cases comprise illustrations of the fatal development of scrofulous action, with and without any evident exciting cause.

Although I cannot point out any circumstances by which the hereditary predisposition to scrofula may be always correctly distinguished from an acquired predisposition to that disease, yet there are certain means of deciding this question with tolerable certainty in many cases. If the child of parents who are not in the ordinary acceptation of the term *scrofulous*, be well nursed, judiciously clothed, and permitted to take a proper share of exercise in the open air, thrive and become fat, and appear hearty and strong until the age of seven or eight, we should certainly conclude that such a child would not be *very likely* to be a martyr to scrofula; not merely because he had passed that age at or before which hereditary scrofula first indicates its existence and influence, but

also because those measures which have a tendency to fortify the constitution against the occurrence of scrofula have been adopted; but if such an individual be now, from any cause, much exposed to the influence of cold without a proper protection from its degree of intensity; if the food be of an unwholesome and little nutricious description; if personal cleanliness be neglected; if pure air and well ventilated apartments be exchanged for crowded rooms and a noxious atmosphere; and inaction substituted for a proper degree of exercise, scrofula will be very likely to occur, and to proceed to the full development of its local effects. Such is an illustration of an acquired predisposition to scrofula, and of the means by which such acquired predisposition is effected.

Now it is not possible for me (in these brief remarks on scrofulous ophthalmia) to do more than point out in this very cursory manner certain illustrations of these occurrences; it is not possible for me to do more than direct attention to these general indications of either hereditary or acquired predisposition to scrofula; and in doing so I must not neglect to notice several circumstances, which, it may be observed, are not less valuable as prophylactic than as curative means. And here let me observe that if the neglect of means calculated to maintain and improve the general health, and the substitution of impure air and unwholesome food for pure air and a proper and nutricious diet, be capable of producing scrofula in a child apparently not at all predisposed to suffer from such a disease, until the period when these injurious agents were employed, how salutary must be the influence produced by the adoption of proper protective measures, both in warding off the attacks of scrofula and in diminishing the severity of their effects when such attacks take place?

It has been attempted to classify scrofulous patients,

and Beer has indeed arranged them as correctly as perhaps any one can arrange them who is desirous of reducing them all under a few specific classes; but, as the subjects of scrofula vary much in their external characters, and as the local symptoms generally attending one class of scrofulous patients sometimes attend those of a contrary description, and (if we accept Beer's arrangement) of a character quite the opposite of that to which such local symptoms are (if we deem his classification correct) peculiar, we are compelled to dissent from any such arrangement; that is, if it be intended to include some particular local symptoms, and such only, under any given description of physical character and mental manifestation.

We admit (and it is highly important to the correct and scientific treatment of this disease to bear this distinction in mind) that some scrofulous children possess much mental activity at an extremely early age, a precocity of intellect which is characterized by quickness rather than by power, and that such individuals are endowed with great susceptibility; and that they are generally characterized by a thin and (as it is phrased) a transparent skin, a finely tinted cheek, light hair, and blue eyes; and we further admit, that the scrofulous symptoms to which they are chiefly obnoxious are strumous inflammation of the lungs, the development of pulmonary tubercles, or as it is termed, *tubercular consumption.* The other class of strumous patients, and the only other class sufficiently numerous and generally known to require particular description, is, on the contrary, characterized by a dulness and obscurity of intellect. Such children possess dark eyes and hair, and a skin by no means remarkable for transparency or tenuity; they have frequently a deep diffused redness of the cheek, and a harsh, dry, husky

state of the skin; and the functions of the body, like the operations of the mind, are performed in a sluggish and torpid manner. When scrofulous action is excited in these patients, they are generally affected with chronic abscesses, enlargement of the superficial absorbent glands or of the bones, and thickening of the upper lip. But the patients of the first class are also sometimes affected with one or all of these symptoms; some of the most clearly marked symptoms of this description it has fallen to my lot to witness have been noticed in patients of the first class; and, on the contrary, the dull torpid subjects included in the second class are sometimes the victims of phthisis, without ever having been attacked with any external scrofulous affection. It will be remarked, that, between these two classes there are many degrees, and that very many children who are the subjects of hereditary scrofula, would not be considered to labour under such a disease if judged by their appearance alone; so that all that will be understood by this essay at classification, is, an attempt to arrange merely those scrofulous children (and they constitute a very considerable number) whose appearance, observation, and experience prove to be most generally susceptible of its most destructive influence.

There are certain parts of the body very easily affected with morbid action in scrofulous individuals by agents which, in persons not so predisposed, would be inadequate to its production; and I particularly allude to the frequent occurrence of scrofulous ophthalmia and strumous disease of the lungs; and there are certain parts or classes of parts in the animal machine, very generally obnoxious to scrofulous action, such, for instance, as the mucous membrane of the eye, and of the lungs, the upper lip, absorbent glands and bones, but there does not appear to be any thing in the *actual structure* of these parts *very powerfully* dis-

posing them to suffer from struma more than other parts; and indeed we have an ample explanation of the circumstance, quite unconnected with the nature of their anatomical qualities. The mucous membrane of the eye and of the lungs is much exposed to variations of temperature and to the full influence of any coldness of atmosphere to which the body may be exposed; the upper lip is continually irritated by the nasal secretion, its surface is first red and tender from the lodgement of the discharge from the nose, and the frequent removal of that discharge which its profuseness renders necessary, and is thus placed in circumstances to suffer with increased severity from the cause which originated the evil; the ends of those bones in which scrofula generally takes place, are much exposed to cold (I refer particularly to those which are not defended from the atmosphere by much muscle or fat,) and to the influence of external agencies; and the superficial glands are liable to have their action interfered with by similar causes. It is scarcely fair to say that certain parts are affected with scrofula, in consequence of the peculiarity of their structure, when other circumstances adequate to decide the seat to which the disease shall direct its attention and in which it shall evince its action, can be adduced; nor is such language by any means correct—for if it were correct, all parts of a similar structure should be equally, or almost equally, obnoxious to its ravages. If certain parts of the body were obnoxious to scrofula *merely* on account of the peculiarity of their structure, why should the mucous membrane of the bladder and vagina and the urethra obtain an almost invariable exemption from scrofulous disease, whilst membranes of the *same class* in other situations are frequently so diseased?

I have known some children, who, after having been accustomed to the clothing usually worn around the neck

have been disposed to arrange the shirt collar so as to expose that part very much, have become affected with enlarged glands, and who, on this account only, have been considered strumous; but clothing the neck, and protecting the parts by their usual and former mode of dress, have been sufficient to procure the removal of these enlarged glands without any medical treatment whatever. There can, I think, be little doubt, that all parts *as regards their structure merely* are equally or nearly equally obnoxious to scrofula, although many circumstances not connected with mere structure, render certain parts more disposed to suffer from scrofula than others. It may be said if the former part of this statement were correct, the subjects of scrofula would not merely have thick lips, and enlarged glands, and tubercular lungs, but would in fact be pretty universally scrofulous; (that is, the local indications of scrofula would, in this view of the case, be infinitely more numerous than they are now found to be) and such indeed would be the case if the occurrence of disease of a particular kind to any important extent, in one situation, did not prevent its appearance (I am now speaking of the general rule) in another, or at least much diminish the number of local maladies consequent on the constitutional affection or predisposition; if it did not, in fact, so free the constitution from its morbid imbuements as to render any additional occurrence of local disease unnecessary for its relief. You will remark the influence of this law in various situations as applying to a great variety of diseases, and you will be careful not to confound it with another important law connected with the animal economy, and so ably discussed by the celebrated HUNTER, I mean the *disinclination of the constitution* to accept of two specific diseased actions at the same time, which he illustrated by mentioning the suspension of the progress of one kind

of eruptive fever (small pox) during the existence of another (measles); and the appearance of the former malady, on the decline or removal of that disease which had first taken possession of the system.*

I will now proceed to illustrate my position in reference to the *repugnance of the constitution* to permit the local evidence of a constitutional disease to exist to a very, and almost equally great extent, in two situations, at one and the same time; observing, however, that these illustrations are not intended as a discussion of the question as to the extent of the constitution's capacity to permit the existence of two dissimilar diseases at the same time; nor of the capacity of any given part to be the seat of two dissimilar diseases at any one period; nor shall I, on the present occasion, prolong my remarks by discussing the subject of modified disease, so well illustrated by the changes effected in small pox by vaccination, when it appears soon after vaccine inoculation; and by changes wrought on the appearance and symptoms of disease by medicines, of which modification of disease the altered characters of a syphilitic sore by the use of mercury, affords a good example. But to return :—if a person undergo amputation of the leg for fungus hœmatodes of that part, that disease will, not infrequently, re-appear in a more destructive form in some other situation; if a cancerous breast be extirpated, cancer in some other situation in which it was either not at all existent previously, or existent merely in a latent form, will very often be detected soon after the operation; if an eye affected with melanosis be removed, melanoid degeneration of some other part, will in some instances speedily supervene. However these observations have little to do with the question concerning the local and con-

* *A Treatise on the Blood*, &c. By JOHN HUNTER, p. 5, et seq.

stitutional nature of these diseases at their commencement; for it would be inadmissible, as decisive evidence on either side, to assert, that because a diseased part had been removed after it had existed for a long time, and the system had deposited the morbid materials with which it had been imbued in some other situation, soon after such removal by a surgical operation, that such disease was *in the first instance* a constitutional malady.

It would appear from the preceding facts that there existed a necessity, on the part of the constitution, to deposit certain morbid materials, and that when once it had selected some situation for this purpose, the deposition of such morbid materials was confined to that part, but on the removal of that part, or on the increased contamination of the constitution, it selected some other situation for the concentration of its morbid operations or products. Hence may be perceived a wide field of interesting pathological inquiry, as regards the circumstances which are necessary to render the removal of what is usually termed a malignant disease, when not of an extensive nature, attended by a permanently successful result.

The parts of the eye *most commonly* affected in strumous individuals are, the conjunctiva—the cornea—the membane of the aqueous humor—the iris—and the retina. The affection of all these parts except the retina, is characterized by symptoms which clearly indicate the nature of the inflammation, but the latter would appear to be merely a sympathetic affection, unattended by any (properly inferred) alteration in its condition of vascularity, or any change in its organization ;* for, it will often happen,

* Baron Dupuytren takes a totally different view of the subject, and appears to consider the photophobia associated with strumous ophthalmia, a symptom of an actual inflammatory affection of the retina, rather than a condition of sympathetic irritability on the part of that delicate texture. He says, " inflammation of the retina, which

that the retina of an eye will be so extremely susceptible of the stimulus of light during the middle part of a clear day, that the little patient will be compelled to adopt measures to protect it from its influence; but, in the evening, or as soon as twilight commences, the eyes will appear to be unaffected with disease, and the child will play about as freely as his companions. If such a child be taken from a dark room into a well-lighted apartment, he will be quite unable to keep the eye-lids open for an instant, but if he be then conducted back to the darkened room, he will open them with the utmost ease and freedom; thus proving most clearly, (with all due allowance for the effect of the contrasted stimulus on the retina of the healthy eye) that although the susceptibitity of the retina to the stimulus of light be much increased, there is no positive or permanent change in its state of vascularity, nor any alteration whatever in its structure. I have examined the eyes of children who have died from the supervention of acute disease upon an attack of strumous ophthalmia, which had not been beneficially influenced by a long course of treatment, but which had, as is almost always the case, been relieved though not entirely removed by the new disease, so that the patient's vision was much improved prior to dissolution by the diminished susceptibility of the retina; but, in no instance, have I de-

very frequently attacks scrofulous children, and is characterized by horror of light, may no doubt be treated by bleeding, leeches, purgatives, setons, &c.; but experience has too often convinced me of the insufficiency of these means, and has consequently led me to seek for others. That which during ten years has succeeded best, is the internal use of the powder and extract of belladonna." I shall only remark upon this statement of the distinguished Baron, that he appears to have termed that *retinitis*, which is usually designated *photophobia*, and that he has separated for distinct consideration as an acute disease, a mere symptom of a comparatively unimportant affection.

I may here remark that Professor Koreff assures me he has witnessed the most surprising benefit in the *photophobia scrofulosa*, from the internal administration of belladonna.

tected any scrofulous degeneration of the retina, or any alteration which justified a supposition that it had undergone any organic change.

It was said at an early part of these remarks that the upper lip is frequently much enlarged in a certain class of scrofulous patients, and I have endeavoured to explain the cause of this enlargement, which does not, at least in my opinion, at all depend on any peculiarity of structure, but on various sources of irritation, the nature of which it is unnecessary to repeat. Mr. Lawrence and some other writers are of a far different opinion, they say that the upper lip is thickened in common with other parts of a *glandular structure.* Now, language such as this, besides containing an error with regard to fact, is most indefinite in its signification, and has a tendency to produce much confusion and misconception. You are accustomed to hear of glandular swellings, and glandular enlargements, and you quite correctly believe such language to imply an increase in the size of one or more glands, but if, according to the same rule, you were to consider the term *glandular structure* as synonymous with the *structure of a gland,* it is quite obvious that you would misinterpret the meaning of Mr. Lawrence and others, when they assert that scrofula has a tendency to attack *glandular structures* such as the lip; for, they do not mean to say that part is actually a gland, but merely, it is presumed, to allude to the firmness, compactness, and density of its structure. But even admitting that the upper lip were correctly designated "a glandular structure," there is no evidence to prove that the enlargement and thickening it frequently undergoes in scrofulous patients, occurs merely in consequence of its possessing that structure, or indeed on any mere peculiarity of its organization; on the contrary, there exists abundant proof that this is not the case, and

that, that event is dependent on circumstances unconnected with the anatomical structure of the lip. The lower lip, the pyloric extremity of the stomach, the mouth and neck of the uterus, are all of them of a dense and compact, and, if you will have it so, of a "glandular structure," yet they are not subject to the same kind of enlargement in strumous individuals, as the upper lip, which must have been the case if the upper lid had been thickened and increased in firmness, *merely in consequence of its structure*, without reference to situation and other causes which I have previously considered to yield an adequate explanation of this occurrence. Identity of disease should be associated with identity of structure, if morbid action selected the seat of its operations merely in consequence of the particular texture of the part in which it occurred; or, in other words, in a child of a strumous habit, which diseased habit had a tendency to evince its existence by the production of some local phenomena in parts of a certain structure, it ought, all other circumstances being equal, to attack each part possessing such structure at one and the same time, but as this is not the case as respects the local indications of scrofula, the opinion which represents the disease of a part, as occurring in that particular situation merely in consequence of the peculiarities in the structure of that part, must, at least as regards scrofula, be incorrect.

Scrofulous ophthalmia, like other affections of a strumous nature, very rarely appears for the first time after adult age. Although the scrofulous maladies of the eye are somewhat numerous, and very frequently witnessed, they are in a great measure limited, (with respect to the time of their first appearance) to children.*

* "I think I have most commonly seen strumous ophthalmia in children from the first to the sixth year." WELBANK's Edition of FRICK,

Having made these preliminary remarks, I shall proceed to discuss the

General characters of strumous ophthalmia.—Strumous ophthalmia is an inflammation of the conjunctiva occurring in scrofulous subjects and is modified in its characters by the strumous condition of the constitution. It is characterized by the slightness of the pain and redness, great intolerance of light, profuse lachrymation, spasmodic twitching and contraction of the muscles of the eye-lids and face, whenever the eyes are exposed even to an ordinary degree of light, and by the great length, thickness, number, arrangement, and peculiar curvature of the eye-lashes. This is indeed a very general and brief description of the more common symptoms and characters of scrofulous ophthalmia, but there are many other circumstances, claiming attention which will be mentioned when we enter upon the details of our subject.

There is yet one other point which it will be right to mention here with a view of preventing any interruption to the regular history of the disease, and the description of its symptoms. Strumous ophthalmia rarely attacks each eye with equal severity at the same time, although it often happens that both eyes are affected at the same period, the one slightly, the other more severely; but, as soon as

p. 29. "Il est sur ce point une circonstance digne de remarque; c'est que la diathèse scrofuleuse disparoît assez souvent d'elle même dans les enfans lorsqu'ils entrent dans l'âge de la puberté, et lorsque tout le corps se développe. Si cet hereux changement arrive dans ceux qui sont affectés d'ophthalmie *chronique*, on observe, comme cela m'est quelquefois arrivé, que cette maladie disparoît aussi spontanément à l'époque indiquée avec la diathèse générale." Léveillé's translation of Scarpa. Tom. 1. p. 258. "When scrofulous affections of the eyes occur in children, or before the age of puberty, the change which the system undergoes at that remarkable period, frequently checks and sometimes removes them altogether." Edmonston. p. 141. "Strumous ophthalmia is seldom seen after puberty; but other forms of ophthalmic inflammation are often found more obstinate in persons of scrofulous constitution." Lawrence, p. 244.

that organ which was in the first instance severely affected, is nearly restored, the other eye becomes worse, and in this way they alternately recover and relapse. We very rarely indeed see both eyes equally affected with strumous ophthalmia at the same time.

Redness.—The redness in strumous ophthalmia is generally very partial and very slight; sometimes there will be merely a few enlarged conjunctival veasels, passing nearly in a parallel direction, with regard to each other, towards the cornea, and terminating in a minute phlyctenula or a small pustule, occasionally these phlyctenulæ or small pustules form upon the sclerotic portion of the conjunctiva at some distance from the cornea; sometimes these vessels spread upon the cornea itself, rendering that part of its circumference upon which they pass, slightly vascular, and not infrequently terminating at the margin of a small pustule, which may or may not degenerate into an extensive ulcer, but which always leaves behind for a longer or shorter period an opacity of a variable size and density. The vascularity of the conjunctiva will not be equally diffused, nor, in short, will there be, in many instances, even where the intolerance of light is peculiarly distressing, any very great amount of conjunctival redness; one or two much enlarged trunks, or a pencil or fasciculus of smaller vessels, is however, very frequently noticed. If you evert the lids and examine the condition of their mucous surface, it will be found to be much redder than the sclerotic portion of the conjunctiva, but I think not more so in proportion to their relative degree of vascularity in a healthy state of those parts; for it will be remembered that the palpebral portion of the conjunctiva is naturally less pale and more vascular than its sclerotic division. In the advanced stages of the disease you will find the vascularity increased, and in very severe and procrastinated cases,

the inflammation will extend to the sclerotica, the cornea, and the iris; but still you will not, on any occasion, notice that extreme and equally diffused vascularity of the conjunctiva, which will be met with in many other forms of inflammation, in which, as in the instance before us, that membrane is chiefly and primarily implicated. The symptom we are now considering, as well as the characters of the disease in general, will, of course, become materially changed when the inflammation extends to other parts, but it is not my intention to follow up the consideration of those changes on the present occasion, as they will be more conveniently discussed, when we speak of strumous corneitis, and strumous iritis.

Pain.—You are aware that scrofulous productions—scrofulous diseases—are not generally attended with any considerable degree of pain; they are commonly slow in their progress and development, and obstinate in duration, but by no means accompanied with much pain; and the same may be said of strumous conjunctivitis as regards the sensation of pain; for, when strumous inflammation of the conjunctiva takes place, it is not necessarily attended with any other pain than such as is produced by the action of light upon the retina. This, however, is not surprising, when we take into consideration the very slight amount of actual inflammation which is present, and that a texture so loose and distensible as the conjunctiva is the seat of that inflammation—a texture which has the power of admitting not merely considerable distention of its vessels when enlarged under the influence of inflammatory excitement, without sustaining or producing much pressure, but which admits of that amount of effusion, by which the distention of the blood vessels is diminished, and the quantity of their contents lessened. It has been explained that the retina is in a highly susceptible condition in this disease,

and this state of increased sensibility is a derangement not dependant on any variation in its grade of vascularity, or upon any ostensible change in its organization, inasmuch as when all bright light is removed, as in the evening, and particularly during twilight, there is no evidence of disorder or disease of the retina present. If, at this time, you were to see a child suffering from scrofulous ophthalmia, whom a few hours before you had visited, you would, if not familiar with the fact to which I am now alluding, be surprised to observe the change which had taken place in the state of his vision, or rather in his capacity to face the light. You had left him probably with his eye-lids very firmly closed, his back turned towards the light, and with his hand pressed upon his eyes, in the darkest corner of the darkest apartment to which he could gain admittance, but you now find him playing cheerfully about, with his eye-lids freely open, and exhibiting no marks, no indications of ophthalmic disease. At such a time, and under such circumstances, you will not always be able to select your patient from his companions, if your means of recognition alone depend on the state of the eyes. This then, is one very important means of distinguishing this form of disease, and leads me to point out certain changes in the muscles of the eye and its appendages, and certain peculiarities in the character of the countenance, induced by the patient's attempts to protect the too susceptible retina from that stimulus it is so little competent to sustain.

The orbicularis muscles being frequently engaged in powerful contractions to close the eye-lids, and the corrugator muscles to draw down the eye-brows, acquire a very considerable thickness, magnitude, and strength, and when both of them are vigorously acting to resist any attempt to sever the lids, not only oppose great resistance

to your efforts, but yield an appearance, which, combined with other efforts on the part of other muscles, is strongly and peculiarly characteristic of the strumous affection of the eye. The eye-lids resemble a thick convex body externally; the eye-brows are much depressed, and the tegument between them is puckered into perpendicular rolls or convex ridges; the alæ of the nose are elevated; the angles of the mouth raised; and the cheeks are drawn upwards so as to approach the eye-brows. The effect of this violent action of the muscles of the eye-lids and the face, produces a very peculiar appearance, and such as, when once witnessed, will not be likely to be forgotten.

I must not omit to mention that in consequence of the violent action of these muscles, the circulation of the blood is interrupted, and the free return of the venous blood, particularly impeded, and that, on this account, the face when exposed to the light, presents a flushed and turgid appearance, and the veins are found to be much enlarged and distended; and I may at the same time direct attention to the quivering state of the lids and adjacent parts; an effect which is clearly referrible to the strong and persevering contraction of the muscles. The untired muscles of a healthy individual act firmly and steadily, but various causes, and among others violent and prolonged action, render their motions and their action unsteady and quivering. If only one eye be much affected, the distortion will be confined to that side of the face; the nose and the angle of the mouth will be drawn towards the eye for a certain period pretty much as in many persons after an attack of apoplexy which has produced paralysis of one side of the face. The muscular thickening and enlargement so induced, continues for some time after the disease has been removed, but eventually subsides without leaving behind any personal deformity.

The orbicularis palpebrarum and the muscles of the eye-ball are often affected with spasms, and occasion great suffering, frequently obliging the patient to cry out with extreme agony.

You will, as I have before remarked, notice a quivering of the orbicularis palpebrarum, when the patient is obliged to face the light, or after the eyes have been examined; the muscle quivers and shakes from extreme irritability, and does not act with a proper degree of steadiness and equality; so that the little patient always resists an attempt on the part of the surgeon to examine the eye, conscious of the suffering to which he will be exposed for some time afterwards, owing to the partial and spasmodic action of this muscle (blepharospasmus.)

When the eye of a strumous patient is exposed to the light it will generally induce sneezing, and this is variously accounted for: and, 1. by the irritation of the schneiderian membrane occasioned by the pungent and scalding tears, which at such time pass down the nose in increased quantity; 2. by the connexion of the nasal branch of the ophthalmic division of the fifth pair with that branch from the third which assists to form the lenticular ganglion; and, in other modes, which have been explained according to the particular views of the expositor.

There is also another circumstance worthy remark, another provision against the admission of too much light to the susceptible retina; I allude to the increased number, thickness, and length of the eye-lashes. When we examine the eyes of children suffering from scrofulous ophthalmia, we generally find, particularly if they have been affected a long time or on former occasions, that the eye-lashes are very long, very thick, extremely numerous, and set in double or treble rows, so that they form a shade which greatly obstructs the glare of light, and altogether excludes its more oblique and perpendicular rays.

Pustule of the conjunctiva. Pustule, opacity, and ulcer of the cornea.—There are some writers on diseases of the eye who appear to think that pustules or phlyctenulæ are an invariable attendant on strumous ophthalmia, and that so striking a character of the disease must necessarily enter into its definition, but, as there are many cases in which there is scarcely any appearance of increased vascularity, cases in which the conjunctiva is very little redder than in its natural state, and is not the seat of any phlyctenula or pustule whatever, and in which the chief evidence of disease consists in an extreme intolerance of light, we cannot accede to this opinion to the full extent; although, it must be admitted, that there is no form of conjunctival inflammation, with the exception of that which derives its name from the existence of pustules, in which they so frequently occur; still, however, as they form no essential part of the disease, as pustules may take place in other forms of conjunctivitis, and as strumous ophthalmia may take place without being attended with pustules, we are unwilling to consider this symptom as otherwise than a frequent accompaniment. There are several kinds of pustules, but having alluded to them in the preceding *section*, I shall not refer to them now except to point out one distinction, a distinction of some importance inasmuch as it relates to the characters peculiar to a phlyctenula and a pustule. The phlyctenula is a small white prominence, the cavity of which contains a thin whitish liquid, resembling dirty serum;* the pustule is much larger than the phlyctenula and is filled with pus, or a fluid possessing purulent qualities. The former are always of a small size, the latter vary in their magnitude, and it has been said

* "Album oculi *vesiculis* obsidetur, quæ *phlyctenæ* dicuntur quibus ruptis ulceratio sequitur." Pavli Barbette. *Opera omnia.* Genevæ, 1683. In scrofulous subjects who are lively and of great sensibility, *watery vesicles*, *phlyctenulæ*, take place. Monteath's translation of Weller's *Manual*, vol. ii. p. 267.

that they (pustules) exist in patients of the second class, (the dull, dark-haired, coarsely formed subjects we formerly noticed) in conjunction with strumous ophthalmia; whilst the former, (phlyctenulæ) are present in the ophthalmia of patients of the first class, those, I mean, whose cutaneous texture is thin and delicate, whose hair is light, whose eyes are blue, and whose physical system is extremely irritable and susceptible; and it has also been said that in this last class of patients the disease is more obstinate. It is indeed true that the ophthalmia of such children is less easily relieved or cured, and that phlyctenulæ are generally present; and it becomes a question how far the pustules in the former instance (for we have already explained that pustules not phlyctenulæ generally accompany the ophthalmia of scrofulous patients of the second class, whose dull inactive state of system we also pointed out) are capable of relieving the disease. We know that in erysipelas when the skin is much blistered, when bullæ of a large size and in great numbers, are present, there is much less destruction of skin, than in those cases where the inflammation being equally great, and all other circumstances being the same, they do not appear at all, or only a few of them of a small size; and it is certainly a matter worthy consideration, how far the pustules in strumous ophthalmia are capable of relieving that great degree of *intolerantia lucis* with which it is invariably attended. This opinion receives considerable support from many facts which I shall very briefly mention. Phlyctenulæ generally occur in strumous patients of the first class, in whom the disease is extremely obstinate, and the intolerance of light painfully distressing, whilst pustules more commonly take place in strumous patients of the second class, in whom the disease is less obstinate, less prone to relapse, and is attended with much less intolerance of

light than in the former case. These last are the subjects whose constitution appears to derive so much relief from the formation of strumous abscesses, and I would suggest that the formation of pustules in strumous ophthalmia, affords the same relief to the conjunctiva and to the retina, as the occurrence of the strumous abscess affords to the constitution. Such is the general rule with regard to the formation of phlyctenulæ and pustules as far as my observation has enabled me to determine; liable, however, to many exceptions, so that the contrary to what has been now stated will sometimes be found to occur, that is, phlyctenulæ will accompany the strumous disease of the conjunctiva in patients of the second class, and pustules, that of the first.

Pustules or phlyctenulæ occur in various situations, sometimes upon the cornea, occasionally upon the sclerotic portion of the conjunctiva, but more commonly at the circumference of the cornea, and they are almost always attended by a pencil of vessels, at the point or termination of which they form, for you will understand that the vessels with which the pustule is connected, apparently terminate at its margin, and do not extend beyond it. My opinion respecting the cause of this has been formerly explained; I have supposed that this occurrence may take place, in consequence of the decided impediment offered to the enlargement of the blood vessels, and to the transmission of their contents, by the gradually increased intimacy of adhesion subsisting between the conjunctiva and sclerotica as they approach the cornea; and this view of the subject affords a satisfactory explanation of their frequent formation, where the intimacy of connexion after having been gradually increasing, becomes suddenly and almost inseparably close and firm—that is, at the junction of the sclerotica and cornea. Still

I by no means wish to deny that the mucous membrane in this situation may become affected with aphthæ or pustules or phlyctenulæ from a great variety of causes, such, as those which determine the same occurrence in mucous membrane in any other part.

When a phlyctenula forms upon the cornea it leaves behind a small circumscribed nebula, which soon disappears; but, when a pustule forms, it leads to a more dense, extensive and durable opacity, and it may even proceed to ulceration, and, if unchecked, it may penetrate through the whole of the layers of the cornea, producing the evacuation of the aqueous humor and prolapse of the iris. This can only happen in much neglected cases, in those instances where the disease has been injudiciously treated, or where its obstinacy and severity have been much greater than usual from constitutional causes. And here let me remark that when the layers of the cornea are completely destroyed, and the process of ulceration has reached its serous lining, the membrane of the aqueous humor at that part, will, for a time, resist the pressure of the contents of the globe, and project with a portion of the iris through the ulcerated aperture in the form of a minute black point, which has been called *myocephalon*, (instar capitis muscæ) from its resemblance to the head of a common fly,* but, eventually it becomes weakened, partly by the tension occasioned by the pressure from behind, and partly by the absorption of that portion of its base

* I have seen this appearance very closely imitated by a small annular opacity situated towards the centre of the cornea. When the pupil is so little dilated that the clear part of the cornea only is situated before it, and a part of the margin of the opacity is placed in front of the iris, it may be difficult, on distant and superficial examination, to say whether the appearance noticed is occasioned by the adhesion of the iris to the cornea, or by the existence of an annular opacity of that tunic—a small narrow circle of opaque substance having a clear portion of cornea in its centre.

which is forced against the edge of the ulcer, until it is ruptured, and permits the free discharge of the aqueous humor. An ulcer of the cornea may occur in conjunction with strumous ophthalmia, without the formation of a pustule; ulcerative absorption may take place in the cornea without being preceded by any evident degree of opacity, or without the formation of a pustule. An ulcer occurring under such circumstances, may be called the primitive ulcer of the cornea, and those forms of ulcer which are consequent on the previous existence of a pustule, may be termed the secondary or consecutive ulcer of the cornea.

Lachrymation.—I have mentioned that when an attempt is made to examine an eye affected with strumous ophthalmia, for the purpose of obtaining an acquaintance with the extent to which the inflammation has proceeded, the muscles of the eye-lids and surrounding parts will powerfully contract and resist the efforts at examination, and there will be a profuse discharge of hot, or, as they are familiarly termed, *scalding tears.* It is right to inquire what is the kind of alteration these tears have undergone? In what respect do they differ from the ordinary and healthy secretion of the lachrymal gland? What is the cause of this abundant secretion; and what is the object it is intended to accomplish? It has been presumed that the secretion from the lachrymal gland of a child affected with strumous ophthalmia differs from that of a person in whom no such disease exists, because it has acquired an increase of temperature, and irritates the parts upon which it passes; but when we reflect on the extreme irritability of the skin and mucous membranes of such patients, and also on their morbid sensibility, we at once discover some explanation of both these circumstances, without deeming it necessary to believe that any

material change has taken place in the essential qualities of the lachrymal secretion. It is true that the tears, under such circumstances, are of a higher temperature than tears in general, tears secreted under ordinary circumstances, and so indeed are, for the most part, the secretions of other parts when made with increased rapidity, but the real increase of temperature is by no means so great as patients will represent; the morbid state of their sensibility furnishes a very defective *thermometrical* guide. Although slightly varying the temperature of secreted fluids does not necessarily or usually alter their chemical composition, I am not prepared to state from facts based on information derived from chemical analysis, that the secretion in question is essentially the same as respects its chemical qualities as that secreted in a state of perfect health, but such is my conviction, a conviction founded not merely on analogical reasoning, but because the effects usually cited in proof of this supposed change, are satisfactorily explained on other grounds, and on more certain data. We must, therefore, *chiefly* refer the irritation and excoriation they produce, to the increased susceptibility of the constitution, and the irritability of the parts upon which they flow. If you consult books upon this subject you will find that this increased lachrymal secretion is attributed to sympathy, to pressure, to the anatomical connexion of parts, and to many other causes of a less satisfactory nature, and you will also find it stated that it is intended to relieve the inflammatory affection of the eye, and to diminish the susceptibility of the retina to the stimulus of light. The various parts of the eye intimately sympathize with each other as is well known; if, for instance, a little dust or other minute substance adhere to the cornea or to the mucous lining of the lids, the eye instantly becomes acutely sensible to light;

if the iris is inflamed, the same effect generally takes place, proving most unequivocally the intimate sympathy existing between the conjunctiva and the retina, and that subsisting between the latter structure and the iris; and in the inflammation under consideration, the retina is acutely sensible to light—a sensibility which we have explained on the principle of sympathy. Now, as we know of very few cases in which the eye is extremely intolerant of light, unattended by an increased flow of tears, it has been conjectured that the lachrymal gland especially sympathizes with the retina, under the circumstances I am now presuming to exist, and that, on this sympathy depends its augmented secretion in strumous ophthalmia; but as we are acquainted with *some* instances in which, with a highly susceptible state of the retina and great intolerance of light, there is no increase—no material increase—of lachrymal secretion, it is proper to search after an explanation of this occurrence which will not be exposed to this important objection. In those cases where with an increased susceptibility to light, there is no augmentation of the lachrymal secretion, the eye is as usual subjected to pressure by the augmented action of its muscles and those of the lids, and if the increase of lachrymal secretion which takes place in strumous ophthalmia depended alone on pressure, it ought to occur in every case of ophthalmic disease in which pressure is proved to exist; this therefore is also an objectionable explanation. Without stopping to inquire how far pressure upon the lachrymal gland is capable of exciting it to augmented action, it is difficult to conceive how this pressure could take place under the equable action of the whole of the muscular apparatus of the eye-ball, and of the orbicularis palpebrarum; for, the action of the muscles of the globe would compress it in all directions in which the obicularis muscles of the lids did

not so compress it, and the combined influence of this general compression would not be, as it appears to me, to increase its magnitude, nor would the swelling of the muscles in the act of contraction occur in any situation so as to press at all materially upon the lachrymal gland, defended as it is, by a depression in the orbit, from the influence of that pressure which some have deemed essential to its action.*

The lachrymal gland obtains its nervous supply from the lachrymal branch of the ophthalmic division of the fifth pair of nerves, which distributes many branches to the conjunctiva,† and thus establishes a communication of a very intimate description between these parts. Hence, as I imagine, arises that close sympathy, the cause of which we are now concerned in explaining. You will perhaps tell me that if such an explanation were correct,

* The enlarged and hypertrophied condition of the lachrymal gland consequent on the prolonged excitement to which it is subjected during the continuance of scrofulous conjunctivitis, appears to account, in a certain degree, for that increasedly profuse lachrymation which accompanies every succeeding attack of the malady when the relapses are frequent. That the lachrymal gland is capable of returning to, and does usually resume its normal magnitude at a certain period after the subsidence of the disease, there can be no doubt, it is indeed an unquestionable fact; I am only alluding to the enlarged condition of this glandular part during the existence of the strumous disease of the conjunctiva associated with photophobia and profuse lachrymation, and also to its state when frequent relapses of this obstinate and troublesome affection, take place.

† "The lachrymal nerve is formed by a branch from the superior oblique oculo-muscular, and the supra-orbital nerve; it gives filaments to the lachrymal gland, and then communicates with the temporal branch of the malar from the second trunk of the fifth, and terminates in the conjunctive membrane, and the skin of the upper eye-lid." *A Demonstration of the Nerves of the Human Body*, by Joseph Swan, p. 36. "The remaining fibrils of the lachrymal nerve are distributed to the muscle and skin of the upper eye-lid, as well as to the conjunctiva. Here they anastamose with branches of the frontal nerve of the first division, and even with the infra-orbitar of the second division of the fifth pair of nerves." *The Anatomy of the Human Eye*, by John Dalrymple, p. 239.

the lachrymal secretion ought to be much influenced in its quantity, by the actual amount of inflammation present in the conjunctiva; but it must be remembered that strumous ophthalmia is chiefly a disease of function, and the phenomenon to which attention is now directed is simply the effect of sympathy, for I am not presuming that the lachrymal gland is otherwise connected with the ophthalmia. You will not deny that the retina sympathizes with the conjunctiva, when your attention is directed to the state of that nervous expansion when a fine particle of dust or any similar substance is irritating the conjunctiva. You know that the retina is very acutely susceptible of its natural stimulus in strumous inflammation of the conjunctiva; and you must have repeatedly noticed how little the retina is affected in many cases in which the conjunctiva is the seat of an active inflammation limited to its own texture. The sympathy subsisting between the lachrymal gland and the conjunctiva, is more intimate and direct than that existing between the conjunctiva and the retina, on account of their particular anatomical relations, but, you must not expect that sympathy to be specially exerted on *every occasion*, any more than you would expect to find the susceptibility of the retina *invariably much increased* whenever the conjunctiva is inflamed.

I do not believe the increased flow of tears attendant upon this disease, is intended to relieve the inflammatory condition of the conjunctiva, not merely because it (the increased flow of tears) is greatest in that disease of the conjunctiva in which the inflammatory redness is developed to the slightest extent, and is almost or altogether wanting in many instances where the inflammation is extremely severe, but because it could not materially lessen the vascular fulness of the conjunctiva in whatever degree of profusion it might flow. Effusion of serum

beneath the conjunctiva; or of sero-mucous secretion from its surface; or the deposition of serum, pus, or lymph, as takes place in the phlyctenula, the pustule, or the active inflammatory chemosis, may relieve the vascular plenitude of the conjunctival vessels, but, the increased secretion from the lachrymal gland cannot, I apprehend, have any such effect, at least, not to any usefully influential extent. With regard to the object of this increased secretion I must confess my inability to furnish any precise information. When we are acquainted with the object the occurrence of the ophthalmia is intended to answer, we shall probably be apprised of the intention of that increased secretion of tears which accompanies, or at least occurs in connexion with it. If it be considered that the one operates in relieving the constitution from its morbid imbuements (scrofula), are we not justified in assuming from the same data that the other acts in a similar manner and is permitted to exist for a like purpose.

There are many other symptoms than those already mentioned, occasionally present in strumous subjects. Sometimes the meibomian glands are affected, producing tinea tarsi; or the edges of the eye-lids may be thickened by chronic inflammation, and disposed to the formation of small suppurations (hordeolum); the face and scalp may become eruptive; sometimes the glands of the neck, the tips of the ears, the alæ of the nose, will be swollen, indurated, and enlarged, or the abdomen tumid and tympanitic; these and many other circumstances will require attention, but as they constitute no necessary accompaniments of the disease of the eye, and are by no means uniform in their occurrence, I shall merely mention the necessity of varying the treatment and adapting the remedies in accordance with these occasional combinations of disease with the more important malady.

Effects of strumous ophthalmia.—The first effect of strumous ophthalmia to which I shall request attention is that in which the disease has, by extension, involved the more important and deep-seated parts of the eye, and led to those changes which such extension of inflammation, from whatever cause it proceed, is likely to produce. Besides the loss of transparency in the humors of the eye, the closure of the pupil, and the adhesion of the iris, either to the capsule of the lens or the neural surface of the cornea, it may produce those changes upon the sclerotica which may lead either to its partial, or its total extension. If the inflammation extend to the iris that part will undergo those morbid alterations which will be mentioned when we speak of the effects of iritis. The cornea may be rendered vascular and opaque, and the opacity may be either superficial or deep-seated, general or partial, dense or nebulous; or, it may become affected with ulceration of a variable size and extent, which, in its worst form, may extend through the whole of its lamellæ and thus produce prolapse of the iris and evacuation of the aqueous humor. When the cornea has been much weakened, either by the destruction of some of its layers; by the substitution of an adventitious substance for its natural structure; or by some change wrought in its texture, whereby it is rendered less firm and compact and less capable of resisting pressure than when healthy, it may yield and give rise to staphyloma. But the change to which this part is most prone in strumous children, who have either been the subjects of repeated attacks of ophthalmia, or of one obstinate and prolonged attack, is, an increase of its vascularity. This increase of vascularity may be simply confined to the production of a few vascular trunks (which generally ramify between its mucous covering and its primitive layer) or, they may be very numerous, rendering the cornea an irre-

gularly red surface, and completely destroying its transparency. You will find this disease described in books under the name of *pannus*, and it will be more minutely considered when we treat of the diseases of the cornea. When the circumference of the cornea becomes vascular, and is permitted to remain so for a long time, the vessels not proceeding far upon its surface, that part becomes changed in texture, and acquires, at least *apparently*, the anatomical characters of the surrounding membrane; sometimes this change is very superficial and the cornea may be imperfectly seen through the semi-transparent membrane covering it, sometimes it extends through its whole substance, and in both cases the cornea *appears* diminished in size.

The effects of strumous ophthalmia may be limited to the conjunctiva, which may be rendered thick and vascular, or even granular. Tinea, thickening of the tarsal margins, and a disposition to hordeolum, and to entropium are not unusual consequences of the frequent recurrence and prolonged existence of strumous ophthalmia.

Causes.—I have stated that scrofula may be either hereditary or acquired, or rather that quality of constitution which disposes to, or admits of, certain local maladies which are termed "diseases of a scrofulous nature;" for although a child may be born of strumous parents, and may resemble in general aspect another child similarly circumstanced in reference to the constitutional predisposition of its parents, who has already enlarged glands, thickened upper-lip, and other local evidences of this malcondition of the constitution; it is not usual to term such a child scrofulous merely on account of its appearance and parentage—such term being limited in its application to those unfortunate children in whom some of the *local affections* to which I have just adverted, *are actually present.*

It now remains for me to mention those events, the occurrence of which, in children who have either acquired or possess by birth a predisposition to strumous action, are termed, the exciting causes of scrofula. In such constitutions strumous ophthalmia may be excited by an accidental inflammation of the eye; and, when this occurs, there will be no difficulty in distinguishing the very marked difference of the secondary strumous inflammation of the eye from the ophthalmia which preceded it, and which, as I have before remarked, disposed this organ to suffer from an inflammation of a different character from that with which it was first affected. Worms in the stomach and intestines are also another cause of strumous ophthalmia as well as the irritation occasioned by teething; exposure to the ordinary causes exciting common inflammation of the conjunctiva, will, in children of a certain constitution, often induce an attack of strumous ophthalmia. Scrofulous ophthalmia is very apt to occur in children possessing this kind of constitution, after measles, scarlet fever, small-pox, or, indeed, after any disease producing a temporary debility or irritability of the system, more particularly those in which the cutaneous texture of the face is the seat of any kind of eruption. Besides then, the various causes which operate upon the eye itself, there will be perceived, in this arrangement of the causes of strumous ophthalmia in children, any and every source of constitutional debility and irritability. It may be further remarked that scrofulous action will be much favoured, and the seat of its operations decided by local irritation and local weakness, such as generally remains after the exit of acute disease, of which fact, the relapses of strumous inflammation of the eye so frequently noticed, and which constitutes a remarkable feature in this class of ophthalmic affections, affords a satisfactory illustration.

Diagnosis.—It is scarcely necessary to allude to the means of distinguishing strumous ophthalmia from the other forms of conjunctival inflammation. If in a scrofulous child (an ample definition of the term scrofula has been given at the commencement of this *section*) the conjunctiva become affected with an inflammation attended by a slight and partial redness, great intolerance of light, and profuse lachrymation; and if, to these symptoms be added the existence of pustules, you would not hesitate to decide upon the nature of the disease; but your diagnosis will often be much assisted by other concomitant symptoms—such as, 1, a thickened state of the tarsal margins, of the upper lip and borders of the ears, a distorted physiognomy from the frequent and powerful action of those muscles which, by their combined agency, tend to protect the retina from the influence of light; 2, the increased length, thickness and number of the eye-lashes, and their peculiar arrangement;—and, in short, by a vast variety of other circumstances which your memory and observation will so readily supply.

Prognosis.—Your prognosis will be mainly guided by the constitutional condition of the child, and the extent to which the disease of the eye has proceeded. If called to a child of great delicacy of constitution, in whom the local evidences of scrofula were decided and numerous, and if the inflammation had existed for some time, and had led to serious changes in the structure of the cornea, such as vascularity and opacity, you would be alive to the necessity of giving a very guarded prognosis, not only on account of the extremely scrofulous state of the constitution, and the probable duration and relapse of the ophthalmia, but also on account of the altered state of the cornea. A large or a deep and penetrating ulcer of the cornea, an extension of inflammation to the iris, the

choroid, or the retina, or an alteration in the figure, or enlargement of the eye-ball, would be most unfavourable circumstances, and would consequently dispose you to pronounce an unfavourable opinion respecting the probable termination of any case in which they may be present.

Treatment.—Although I have mentioned two classes of patients as originally suggested by BEER and admitted to a certain extent by every one who has paid much attention to the external characters of strumous subjects, yet the descriptions comprehended in these classes are not intended to apply to all scrofulous children, and can only be considered as correct representations of many, in whom the characters of scrofula are singularly well-marked and perfectly developed. There are, of course, many gradations between the one and the other of these classes, and there are some in whom the characters of scrofula are so faintly exhibited that we may fairly hesitate to consider them scrofulous at all. Many cases of inflammation of the conjunctiva will present themselves to your notice which possess the characters of scrofulous modification so faintly and partially, that they will by no means correspond with the description I have given, for, in order to furnish you with the most accurate account of scrofulous conjunctivitis, I have purposely selected those cases in which the disease is marked by the most distinct and unequivocal symptoms. You will remember therefore that practice will supply you with cases in which none but the most constraining fancy can detect the whole series and group of symptoms usually set down in books and represented by lecturers as the proper characters of strumous ophthalmia.

As the symptoms of strumous conjunctivitis indicate much local and general debility, and great disorder of the stomach and bowels, and as the skin is usually harsh and

dry, and as the degree of actual inflammation is rarely very considerable, you will perceive the necessity of a constitutional as well as a local plan of treatment—a treatment directed to the removal of that disordered condition of the system on which the origination of the disease depended, and by which it is maintained, rather than a treatment directed merely to the amelioration of the morbid state of the eye.

There are certain aids to medical remedial measures which demand especial attention, and as the description of them before we enter upon the consideration of what may be more strictly termed the medical part of the treatment, will prevent the necessity for that interruption which must otherwise occur, I shall proceed to discuss their value and to consider the mode in which they may be advantageously adapted in these cases to the removal of certain mal-conditions of the system.

When we spoke of the various circumstances which had a tendency to induce, what was termed, an acquired predisposition to scrofula, we represented the very great share which an impure atmosphere, an ill-regulated system of exercise, injudicious clothing, and deficient or improper food, had, in producing that state. We shall now make some observations upon each of these subjects, in reference to the treatment of strumous ophthalmia.

You would always make particular inquiry with regard to the residence of your patients, and if you found that the spot in which they lived was unhealthy, either from the dampness of the situation, its proximity to some deleterious manufactory, or from the ill-ventilated or excessively crowded state of their apartments, you would of course direct those beneficial changes to be made in these particulars which observation and experience suggest. If the circumstances of the friends permit, you would advise

the patient's removal to a purer atmosphere,* and, if that direction could not be conveniently complied with, you would offer those suggestions for the improvement of their present situation, which, on general principles, you would judge to be most conducive to health.

Exercise.—Strumous persons do not sustain a fatiguing degree of exercise without suffering much injury afterwards; and if you direct a given quantity of walking exercise to be taken daily, without making particular inquiries respecting your patient's strength and capacity for exertion, your advice (if followed) will have a most injurious influence. Generally speaking, exercise on horseback is most beneficial, but nothing can justify the practice so frequently enforced by parents on the vague understanding that exercise is healthy, of obliging their children to sustain a diurnal amount of exercise without distinct reference to its individual effect. The rule upon this subject which ought to guide your practice is very simple—if walking exercise be deemed advisable, let that

* Sæpius non solum corpus in aëre puriori, præsertim calidiori ita quidem moveant, ut sudor cute prorumpat,—id quod ægrorum curationem magnopere sublevabit,—sed etiam omnem vitent corporis quietem, non per longum dormiant temporis spatium, atque e somno suscitati perpetuo negotiis sint occupati, modica vini generosi copia cibisque facile digerendis, carneque imprimis affata utantur, atque sæpius balneum tepidum ingrediantur. Benedict. *De morbis oculi humani inflammatoriis.* §. 464. "It is very important to attend to the dietetic treatment; and the greatest attention should be paid to the nutrition of the patient, to air, exercise, &c." Welbank's edition of Frick *On the Diseases of the Eye*, p. 35. "In scrofulous cases the regulation of the diet is very important, in regard to the quantity and quality of food, and the number of meals. Scrofulous subjects should be warmly clothed, especially in the colder part of the year. It is always desirable that scrofulous subjects should take exercise; and I would by no means confine them to the house, even in cold weather, but allow them to go out protected by sufficient clothing. Residence in pure air is of great importance to the scrofulous, and they often recover from serious disease, merely by being removed from large towns to the country or the sea-side." Lawrence. *A Treatise on the Diseases of the Eye*, p. 252 et seq.

amount be taken which does not produce at the time any extreme degree of fatigue, nor leave behind any long-continued or unpleasant feeling of lassitude; but if the sense of fatigue be more considerable or more durable than it ought to be after having taken a given quantity of exercise, either the mode of taking it must be altered, or the quantity taken abridged, for it may be truly said that such effects are incompatible with any useful tendency or salutary influence.

Diet.—The characters of the diet best suited to strumous patients, are very few and simple; it should be light in order that it may be easily digested, and nutritious, that the system may be properly and efficiently supported. Not only are the digestive powers of strumous patients generally weak, but their appetite is very uncertain, so that it is most important that those supplies which are administered should be rendered efficient by the digestive powers, and possess those qualities which do not require, on the part of the stomach, any great efforts to elicit the nutriment they contain. It is absurd to permit the patient to take a mass of food, which when digested, yields scarcely any useful product, and which, if undigested (as such description of food generally is,) must necessarily occasion much disorder and derangement of the functions of the system generally. You might select from the following articles of diet—namely, light animal food, animal jellies, milk, rice, sago, arrow root and eggs. Animal food taken once during the day will be advisable, unless any particular circumstance should negative its use, and you may direct your patient to take a little milk and arrow root at breakfast, and, in the evening a little jelly, or good veal broth, or beef tea. By means of a diet regulated in its adaptation by these *principles*, the powers of the stomach will be maintained, but not enfeebled by

over-exertion, and that organ will only be furnished with that amount of food which can be converted into nutriment without leading to any oppressive accumulation or producing indigestion. Every case will require for itself a properly regulated diet, and you will join with me in smiling at the absurd enthusiasm of those who lay down rules of diet and rules of practice as though they were to be applied on all and on every occasion.

Clothing.—You know that a certain quantity of warmth is essential to the continuance of our existence, and that we all possess the power of producing or of generating heat —animal heat. Now, without entering upon the inquiry as to the object this attribute of human life is intended to fulfil, I may mention that a certain part of this animal heat is removed by the skin, or, if you prefer it, by the influence of external agents acting upon the skin, and also by various secretions and exhalations. There is a proper thermometrical temperature for the skin at every season of the year (which is not, however, exactly the same in all individuals), and however great may be the power possessed by any person of generating animal heat, the proper warmth of the surface cannot be maintained, when surrounded by a very cold atmosphere, either unless it (the surface of the body) be well covered, or the individual be engaged in taking active exercise. The capacity of generating animal heat is greatest in adult and middle age, and least considerable in old age; for, although a person advanced in life can sustain a greater degree of cold than a child, yet this does not depend on the diminished capacity of the latter to generate heat, but on the free expenditure of it, compared with that of the older subject, in whom every process proceeds in a torpid and sluggish manner, which is best calculated to economize the powers of the system and adapt the expenditure to the supply. Persons

of feeble constitution, and persons whose powers of life are much lowered, are capable of generating a much less quantity of animal heat than those who are more healthy and robust; hence you will discover an explanation of what you must have repeatedly noticed, namely, the comparatively large quantity of warm clothing worn by weak persons and invalids. Now, as the capacity of generating animal heat is generally in proportion to the degree of vigour of the system, you will not be surprised to find that scrofulous children (whose vital powers are commonly very feeble) should require warmer clothing than other children; nor will you be surprised to discover that they are rendered much worse when exposed to the inclemency of the weather with an inadequate protection from its influence. Parents will sometimes tell you that they obliged their children to use the cold bath, and to be exposed to the cold without being warmly clothed, in order to render them accustomed to the cold, or, as they term it, "to make them hard," and truly, to stiffen and almost freeze their limbs with cold, is not a bad way to make them hard in one sense of the word. They will also tell you that some relative or friend reared a fine family of healthy children by the adoption of the same means, whilst another friend brought up his family in a totally different manner, and was rewarded for his care by possessing a very sickly and delicate offspring; and these things they will mention to you with a view of proving that every thing has been done by themselves to strengthen and benefit their children's constitution; and if, after they have made this representation, you were to tell them that their children would probably have had neither disease of the lungs, nor enlargement of the glands, if they had not treated children naturally puny and delicate, as their friend treated his strong and robust offspring, they will by

no means approve your judgment. I do not mention this presumed case with a view of advising you to blame individuals for faults committed under erroneous impressions, but I mention it to prove to you the importance and necessity of strengthening the powers of life by one of the most simple means of cherishing and sustaining them. The cases are very numerous in which defective clothing of the neck has led to enlargement of the cervical glands, which enlargement has been reduced simply by directing such patients to dress in a more suitable and becoming manner. However, it is impossible to fix upon any description of clothing as universally adaptive, but the following rules upon this subject will be found useful. Generally speaking, flannel should be worn next the skin, and the patient so clothed that the chilling influence of the weather may be resisted;—the object to be accomplished is to maintain the warmth of the surface, and you must adapt the quantity and the quality of the clothing to your patients constitutional vigour and feelings as well as to the state of the weather.

Bleeding.—Having explained that scrofula generally occurs in children who are either naturally or from acquired habit, of a delicate constitution, and that when it affects the eye in the form of conjunctivitis it is not characterized by much redness and inflammation, it will be imagined that I shall not recommend very free bleeding. There are however certain circumstances which may render the removal of blood necessary; for instance, the patient may be one of the second class—one of the heavy torpid individuals, who are sluggish rather than weak, the inflammation may have extended to some deep-seated parts, or it may from the first be characterized by a considerable degree of conjunctival inflammation and by great pain. In such case there could be no doubt

respecting the utility of bleeding, and you decide upon the general or local detraction of blood, and the amount to be withdrawn, by the constitutional vigour of the patient, the state of the pulse, and the extent to which the inflammation has proceeded. In many diseases of the eye the intolerance of light is in proportion to the extent of inflammation, but if in these strumous cases you were to judge of the amount of inflammation by the existing degree of *intolerantia lucis*, your opinion would be extremely inaccurate, and if you were to adapt and regulate your treatment by such an erroneous view, your practice would be exceedingly mischievous; for, in the worst, the msot obstinate cases of strumous conjunctivitis which you will be called upon to manage, the intolerance of light will be greatest where the outward inflammation is slightest, and where the constitution is most feeble and least capable of sustaining the loss of blood without suffering great injury; and, let me repeat, that if in such case you were to apply leeches or take away blood in any other manner, *because* there was great intolerance of light, and to repeat the bleeding *because* the intolerance of light had increased, you would be augmenting by your hurtful treatment the evil you were desirous of removing, and confirming that state of constitution on which the entire mischief depended.

Mercury.—Mercury has been a favourite remedy for the cure of diseases of the eye for many years past, and every one conversant with the treatment of opthalmic affections must admit its value; but it is chiefly in *acute inflammation* of the *deep-seated textures* that its utility is most apparent and decided. In order to determine the propriety of administering mercury in cases of strumous conjunctivitis it will be right to take into consideration the mode in which that medicine arrests inflammatory action, and to inquire into its effects upon the constitution at large, inde-

pendently of its influence upon local disease; and to investigate its various qualities as regards its remedial powers.

The doses of medicines materially influence the effect they are known to produce; thus, tartarized antimony has, when administered in a certain quantity, a diaphoretic property, in another proportion it maintains a state of nausea, and in a third dose it excites vomiting; and so with regard to mercury, by varying and regulating the dose you may render it subservient to the production of various effects; that is, it may be used either as a purgative, an alterative, an absorbent, a sialogogue, and so on; its effects also differ at certain stages of the disease for the cure of which it is administered; and it possesses what may be termed a primitive and a secondary action. It is a powerful stimulant and like all other substances possessing highly stimulating qualities it is also a sedative. The primary action of mercury to which I would beg attention on the present occasion, is, its power of arresting inflammation, and its secondary action, that of promoting absorption.

As mercury has a considerable power of checking the progress of local inflammatory action, you will be naturally led to inquire why a remedy possessing such valuable qualities is not more generally employed for the cure of local inflammation? And this leads me to point out the effect of mercury upon the constitution when given in that quantity which is necessary to arrest local action by its specific qualities. As mercury is a powerful stimulant, as it possesses the property of exciting the salivary glands to much increased action, and as it is also an active absorbent, and has besides the reputation of giving rise, in certain habits, to affections much resembling the secondary symptoms of syphilis, it would be highly improper to administer

it (to the production of what I am now presuming to be necessary, namely, its full mercurial effect,) to persons in an extremely feeble state of health, unless the disease for which it was conceived to be a suitable remedy was so important and dangerous as to justify the hazard attending its administration, and one which could not be properly removed in a reasonable time by other remedies of a milder nature.

With regard to the mode in which mercury arrests or removes local inflammatory action I may mention that the explanation is by no means a fixed and settled point of therapeutics. If you believe that during the existence of inflammation the capillary vessels are in an atonic condition in consequence of the distension they have undergone from the destruction of that balanced action which formerly —when in a state of health—existed between the larger vessels and the capillary tubes, you will be inclined to believe that its stimulus upon those tubes excites them to increased activity, and in this way enables them to urge forward their contents, and reacquire their former tone and size, whilst its lowering influence upon the system prevents or keeps under that undue action of the larger vessels which mainly contributed to the distention and consequently to the atony of the capillary tubes.

From this sketch of the influence of hydrargyrus, when given to the production of a full mercurial effect, we shall be able to discover, that it is by no means a useful remedy in scrofula, as a general remedy, *when administered with this intention*, although some of its qualities and effects are such as to render its administration *sometimes* advisable, and *occasionally* imperatively necessary.

We will now proceed to point out those cases in which the administration of mercury in certain quantities is either

advisable or imperatively necessary. When children have acquired a predisposition to scrofula, when the eye is affected with a lingering inflammation which is slowly changing the structure and impairing the transparency of the cornea, when the abdomen is enlarged, the appetite variable, and the secretions generally of an unhealthy character and diminished in quantity, mercury given in alterative doses would be advisable. Perhaps you might, under these circumstances, advantageously administer five grains of the hydrargyrus cum creta with a few grains of rhubarb, every morning for a week or fortnight or even a month, not with a view of exciting decided salivation, but for the purpose of altering that defective state of constitution which had been acquired or had existed from birth, and to increase or modify those secretions which were either diminished in quantity or vitiated in quality, and to arrest the progress of those changes which were taking place in the cornea. But if instead of this state of things, there was a rapid extension of inflammation to the deep-seated textures, and if there existed a large and deep ulcer of the cornea, in a child of a strong habit of body, you would proceed with more activity, as upon the speed with which you affected the constitution with mercury would, *very probably*, the safety of the eye depend. I know that some surgeons object to the free administration of mercury when there exists a large ulcer of the cornea, which has already destroyed many of its lamellæ, and still evinces a disposition to extend more deeply; they have objected to it, under these circumstances, from an apprehension that the absorbent power of that medicine will render the extension of the ulcerative action, and the removal of the remaining layers of the cornea, more certain and speedy, but when you consider that the inflammation

was the original cause of the ulceration, and *is* the cause of its increase and continuance,* and that the absorbent power of mercury is merely its secondary effect, you will at once admit the propriety of administering it freely in the instance under consideration, and insuring its speedy action by the customary means of inducing rapid salivation. By arresting inflammation you at once remove the source of ulceration of the cornea, and when that has occurred, you have sufficient time to change your treatment, so as to avert or counteract the absorbent power of the mercury. It is further said that the reparative process, that process by means of which the ulcer is healed, is prevented, or at least interfered with, by the debilitating influence of the mercury, but this is a state which also admits of removal, and if you can once suspend the progress of ulceration, you need not be apprehensive respecting your capacity to reinvigorate the powers of the system and increase the reparative powers of the cornea. If you omit the use of mercury in such cases—cases in which the ulceration clearly depends on the acute inflammation of the cornea or surrounding parts,—the ulceration will inevitably extend through the whole of the layers of the cornea, the aqueous humor will be discharged, and the iris may become prolapsed; but if you administer mercury in the way I have mentioned, you will arrest the progress of ulceration by diminishing inflammation, and may then change your treatment, and strengthen the constitution, or stimulate the ulcerated part, as the one or other or both of these measures may be considered most advisable.

Nauseants.—Emetics.—Diaphoretics.—Although nauseants and emetics are strongly recommended in strumous

* Of course I do not mean to assert that every ulcer of the cornea is always dependant on the inflammation of the immediately surrounding textures.

ophthalmia, I do not consider them to be very often useful, on the contrary, they have appeared to me to promote rather than relieve that condition of health we are solicitous to remove. There is often in these cases a state of nausea, partial heat of the skin, with a quick irritable pulse, which neither emetics nor nauseating medicines will remove, but rather increase and confirm. Indeed it will appear evident that nauseating remedies are not well suited to a disease, which is, in general, characterized by great disorder of the stomach and bowels, diminution of appetite, partial heat of the surface, much irritability of the pulse, and feebleness of the constitution. There are, however, some few cases in which the employment of nauseating remedies for a short period may be serviceable; as, for instance, where the heat of the surface is pretty general and also much increased, the pulse very quick without being remarkably feeble, and the appetite voracious without being attended with a due degree of digestive power; but even in these cases, you would not be anxious to maintain a state of nausea beyond that period when the exalted cutaneous heat declined, the pulse became less frequent, and the appetite more moderate.

With regard to emetics I am disposed to recommend extreme caution in their use in cases of scrofulous ophthalmia, for they have a tendency to disturb the action of the stomach; they dispose it to require an inverted action from very slight causes; they enfeeble it by the powerful action they oblige it to assume; and lastly, by inducing a congestive state of the circulation in the head by obstructing the free return of blood, they increase the inflammation of the eye. If there is reason to believe that the stomach is oppressed by its contents, or that some undigested and indigestible aliment is remaining in that viscus and producing much annoyance which may be dis-

tinctly referred to its continuance there, you would prescribe a mild emetic to enable the stomach to discharge the offending agent and by regulating the diet you would of course take care that no second necessity for the administration of an emetic should be allowed to exist, at least as far as depended on the medical attendant to prevent it.

The use of diaphoretics is much to be commended, and as the production of diaphoresis is highly important in this disease, and is much assisted by various means unconnected with the administration of *drugs*, I shall so far depart from my usual plan as to discuss the merits of various remedial means which, conjointly with the administration of medicines, excite the action of the skin.

The condition of the skin in strumous subjects has been represented as being generally harsh and dry with a temperature much increased, though only partially augmented, for whilst the scalp and the face and certain other parts of the surface are much warmer than is natural, the extremities are frequently chilled with cold; we have therefore to remove its harsh and dry state and to regulate the diffusion of its temperature—to distribute the cutaneous warmth more equally than it is generally found to be distributed in persons suffering from strumous ophthalmia. In speaking of the plan of treatment which appears to me most likely to effect this object, I do not mean to exclude other remedies, but as in practice we generally attach ourselves (not, of course, exclusively) to particular remedies, and are frequently successful in our attempts to derive assistance from their adoption by the care we employ in their administration, the closeness with which we watch, and, if necessary, modify and aid their action, whilst others obtain less success from the employment of the same means merely because they do not so frequently use them, nor notice their action with the same degree of attention, I shall

speak only of those means which are generally resorted to in my own practice, and which have appeared to me most useful and efficient. Administer according to the age of the patient, small quantities of calomel and antimony, or antimony and DOVER'S powder, or, if you prefer it, a powder composed of one grain of calomel, two of antimony, and four of DOVER'S powder, once or twice during the day, taking care that one dose is taken in the evening and immediately succeeded by some warm beverage, and at the same time direct your patient to use a warm bath of a moderate temperature every other night, but not to remain in it longer than five minutes, and to adopt the usual precautions afterwards with regard to the hasty drying of the surface by means of active friction with a rough napkin, and you will generally find that the state of the skin will be much improved even if it be not rendered absolutely healthy. There are, of course, a great variety of diaphoretic medicines and various modes of inducing diaphoresis in addition to those now stated, but the means I have just referred to generally answer the purpose very well.

*Purgatives.**—Purgative medicines are almost always useful as occasional accompaniments of almost every plan of treatment adopted for the cure of scrofulous ophthalmia, and, *in some instances*, they constitute so important a part of the management of these cases that their use is quite indispensible to successful treatment. There are many disordered and diseased states of the system which are

* WISEMAN very forcibly points out the importance of purgatives in the cure of scrofulous ophthalmia; and mentions the case of a strumous infant whose eyes became inflamed after small pox, who "fell into a diarrhœa, by which he was perfectly cured of the defluxion on his eyes." (P. 317.) MR. ABERNETHY illustrates the utility of the same class of remedies in a somewhat humorous though peculiarly impressive manner by stating the case of a child, who had long suffered from an obstinate form of strumous ophthalmia, which was speedily cured by the occurrence of an accidental diarrhœa.

corrected by what is termed a purgative plan of treatment, but you would not infer from what has been said, that purgative medicines constitute generally an important part of the system of treatment adopted for the cure of scrofulous ophthalmia; on the contrary, they are in the majority of these cases, merely employed very occasionally, and are only to be considered as subordinate to more important means of cure. It will often happen that during a course of treatment which is by no means essentially of a purgative nature, aperient medicines will be necessary for the removal of costiveness, or to cause the discharge of unhealthy intestinal secretions, or feculent accumulations; circumstances which will be indicated by symptoms with which you are too familiar to render the enumeration of them necessary. But there are cases in which the administration of purgative medicine is indispensible to successful treatment; such cases are characterized by a tumid state of the abdomen, fœtor of the breath, the general evidences of derangement of the stomach and bowels, a disordered state of the secretions generally, and an unhealthy condition of the alvine dejections. You will sometimes find it advisable to select those saline purgatives which much increase the intestinal secretions, on other occasions you may prefer those which promote their peristaltic motion and excite the action of their muscular coat; but my limits will only permit me to recommend you to be guided by the same rules which would decide your selection and regulate your practice in other cases, not fixing upon any one to the invariable administration of which you intend to adhere to the exclusion of all others, but to vary the purgatives with the varied intentions you wish them to fulfil, and to the various indications presented respectively by each case. Of course you must consult the effect of remedies before you resolve on their continuance, and

would be unwilling to persevere in the use of any purgative, without some combination, if experience had proved that it had a tendency to produce much griping or to excite any other equally unpleasant symptom.

Tonics.—We now arrive at a highly important class of remedies, decidedly the most important of those generally employed for the cure of strumous ophthalmia, namely, *tonics.* We will proceed to point out those cases and to enumerate those symptoms, the existence of which render the administration of tonics advisable, and shall afterwards attempt the adaptation of particular tonics to particular cases. There is a certain class of scrofulous patients whose fibre is lax and delicate, whose pulse is quick and irritable, and whose susceptibilities are exceedingly acute. Such a patient would be greatly benefitted by the sulphate of quina, administered in grain doses two or three times a day, and you might at the same time direct the hydrargyrus cum creta to be taken every morning, or every other morning, if the alvine secretions were defective; or if there was acidity at the stomach you might prescribe the carbonate of soda with rhubarb. If the appetite improved, and the symptoms indicative of an irritable state of the system were diminished, you would be assured that the tonic medicine was beneficial and ought to be continued; but if, on the contrary, your patient complained of thirst, and symptoms of feverish irritability appeared, then you would discontinue its use from a proper assurance of its inutility and impropriety. There is another class of strumous patients whose feebleness is still much greater than is the weakness of those I have just mentioned, but there is less irritability and susceptibility of system, their perceptions are less acute, their pulse more languid, and the functions of their system are performed in a comparatively torpid manner. To such patients you would administer

the vinum ferri, and if the bowels required to be slightly acted upon you would direct it to be taken in conjunction with the compound decoction of aloes, but it is more agreeable when combined with the infusion of roses, in which latter form I generally prescribe it.

The class of persons described at the commencement of these observations as characterized by the dull state of the perceptive faculties, the sluggish condition of the system generally, the thickness of the lip, and the deep diffused redness of the cheeks, are not much benefitted by tonics, but are more suitable subjects for the purgative plan of treatment; occasionally the separate characters of the two classes of strumous patients may be as it were blended, some of the symptoms and characters of each existing to a certain extent, and it will then become a matter for consideration how far the tonic remedies are likely to be advantageous. In such cases the general rule is to ascertain the leading, the most prominent symptoms, and having premised general or local bleeding with the use of purgatives, (if either or both these measures are deemed necessary,) the tonic remedies, guided in their administration by the symptoms, may be tried, and their continuance and the modification of their doses decided by their effects, and the occurrence of any additional symptoms which may supervene. The diluted sulphuric acid is also an excellent medicine as well as the liquor potassæ, and I feel assured that they are entitled to quite as much credit as quinine in those cases where the strength is reduced, and the appetite defective, and the system unusually irritable and excitable; and it is right to apprise you that there are many children in whom the exhibition of a tonic which will give energy to the stomach and increase the digestive powers, without exciting, or at least materially exciting the frequency of the pulse, is of great value, inas-

much as almost all the advantages connected with the administration of quinine are gained without its immediately stimulating influence upon the circulation. I have already published my opinions respecting the utility of the sulphate of quinine in various forms of strumous inflammation of the eye, and if any one is disposed to read them, they are to be found in the *Midland Reporter,* and also in the *Medical Gazette.*

There are a vast number of tonic medicines, but it will not be necessary to discuss their relative or respective merits, after having pointed out the object their administration is intended to fulfil, and the principles which would determine our selection in particular cases.

Alteratives.—The last of the class of general remedies to which I shall call attention is termed, *alterative.* Now the object of adopting an alterative plan of treatment, or more properly, for our present purpose, administering alterative doses of mercury, is to effect some favourable change in the constitution by which the products of certain functions are modified and improved and the system acquires some new and salutary excitement. With the utmost care you can bestow, you will not always be able to produce the effect you wish to obtain by means of alterative doses of mercury, for it is not a remedy which is so far manageable as to give rise to the desired favourable changes without interfering with the already existing degree of functional harmony; for although that degree of harmony may be far from constituting the perfection of health, it may by perseverance in such measures when they have fully evinced their inutility, be still further impaired. Small doses of mercury may act powerfully upon the glandular system, or they may produce great constitutional irritation, or they may cause hypercatharsis, or extreme debility. If, however, you discover that the biliary secretion is defective, the

abdomen tumid, and that there are other evidences of a morbid state of the secretions generally, and the inflammation of the eye either be not very great, or having been so, has been rendered by treatment, less extreme, you would commence the administration of mercury in one or other of the following forms:—direct a small quantity of calomel and opium to be taken every night, or as circumstances may vary, a few grains of the hydrargyrus cum cretâ combined with rhubarb every morning, and permit it to be continued either until you perceive indications of its inutility, or of its mischievous tendency, or until the particular morbid state, for the correction of which it was administered, be improved or removed.

It is right to state that iodine has been strongly recommended for the cure of scrofulous ophthalmia, and that a great body of evidence in support of its usefulnes has been adduced by M. Lugol.* I have tried it pretty extensively in many forms of strumous disease of the eye, but have not found it to answer the expectations I had formed of its value from perusing M. Lugol's work.† I should however generally administer it in those cases where the eye was only slightly inflamed, and where there existed at the same time scrofulous ulcers in some part of the body, and also enlarged glands, for I am thoroughly convinced of its influence in assisting the healing of scrofulous ulceration. You will however understand me to say that iodine ought by no means to supersede the sulphate of quina in the treatment of scrofulous conjunctivitis, for although some obstinate cases of this disease will undoubtedly yield to the persevering administration of iodine,

* *Essays on the Effects of Iodine in Scrofulous Diseases.* Translated from the French of M. Lugol, by W. B. O'Shaughnessy, M. D., London, 1831.

† *London Medical Gazette.* April, 1832.

yet a much larger proportion of still more severe and obstinate attacks which have not submitted to the prolonged use of this latter remedy, will very speedily be cured by the judicious administration of the sulphate of quina. In many cases of scrofulous conjunctivitis associated with pustules, I have prescribed iodine with great advantage, and I have also employed the weak iodine lotion with decided benefit when the pustules are very large, and more especially if they have passed into a state of ulceration.

*Local remedies. Counter-irritation.**—I shall not stop

* The importance of counter-irritation as a means of relieving scrofulous ophthalmia, did not escape the observation of WISEMAN. He has related many cases in that *Chapter* of his work which treats of the *Ophthalmia*, to indicate the value of counter-irritation in the cure of this obstinate malady, and he states as a reason for placing "*fontanelles*" behind the ears (which he strongly recommends) rather than at the back of the neck, that when in the latter situation they sometimes induce enlargement of the glands. SAUVAGES says, in the course of his remarks on the treatment of scrofulous ophthalmia, "si tempestas permittat balnea etiam in hac specie fausté succedunt, atque, quod cæteris præstat, est setaceum collo insitum per menses potissimum temperatos sustinendum." (Tom. 2, p. 63.) "The very striking advantages to be derived from counter-irritation, in curing as well as preventing the relapse of strumous inflammations of the eye, are too important to be passed without additional comment. I have seen chronic strumous ophthalmia (succeeding the variolous inflammation of the eye) of seven years duration, quickly and effectually relieved by an issue in the arm. Having once, in the case of a boy, in Christ's Hospital, directed the healing of an issue, which had been made above twelve months, I found the immediate consequence to be a relapse of strumous inflammation and ulceration of the cornea, resisting every measure but the renewal of the issue. Very frequently have I arrested strumous ulceration of the cornea, obstinately progressive, by cutting an issue in the arm. In all strumous ophthalmy, attended by constitutional excitement, and characterized by excessive local sensibility, the influence of issues in the arm is of singular efficacy." WELBANK. Note to his edition of FRICK, p. 35. "Le séton à la nuque, entretenu pendant plusieurs mois, est un des remèdes les plus efficaces contre ophthalmie scrofuleuse." LÉVEILLÉ's translation of SCARPA. Tom. i. p. 258. Statements similar to the preceding ones of WELBANK and SCARPA, are contained in the works of EDMONSTON, TRAVERS, LAWRENCE, and MACKENZIE, and many other approved modern writers on diseases of the eye. However DR. ROWLEY condemns the employment of counter-irritation in the most unqualified manner, although he

to point out in detail the utility of counter-irritation in strumous disease of the eye, because it is one of those established facts which are pretty universally admitted, but allow me to say a few words concerning the adaptation of particular forms of counter-irritants to particular cases, for although counter-irritation is serviceable in almost all instances, it is not absolutely immaterial in what manner and by what means it is produced and maintained. If a child in whom the ophthalmia was not attended with any obvious, or scarcely any obvious degree of increased vascularity of the conjunctiva, complained of extreme intolerance of light, and if, at the same time, there were not apparently present in the constitution the indications of confirmed scrofula, if the disease of the eye had now occurred for the first time, if it affected both eyes and had not been long under treatment, you would (if no local indication to the contrary interfered) apply a blister to the nape of the neck, and direct that it be kept open for a short time, and in this way ascertain the utility or inutility of the practice, and the probability of effecting a cure without instituting a more permanent source of counter-irritation. But if the constitution of the child be thoroughly scrofulous, if relapses have frequently occurred, and if the application of blisters afford merely a temporary advantage, then you

admits that it is merely inefficacious. "I have never (says he) seen one patient afflicted with the habitual (it must be remembered that when speaking of the treatment of ophthalmia he employs the word *habitual* as synonymous with *strumous*) ophthalmia, without seton, issue, perpetual blister or caustic, and yet the disease has continued for years in one state. This is a demonstrative proof that no cure is effected by these means. I believe these applications are used in blind compliance with custom, perhaps to amuse the patient, and to keep up the appearance of doing something; however this may be, *as they are not of any use*, I think they ought to be expunged from practice in these cases." *A Treatise on the principal Diseases of the Eyes*, &c., p. 74. Counter-irritation, as a remedial agent in the treatment of scrofulous ophthalmia is not even mentioned by Demours or Weller.

would at once decide upon the propriety of inserting a seton at the back of the neck, or of making an issue or a seton in one or both temples, or an issue in the arm. The temples or back of the neck would be the more desirable situation for the one or other of those surgical remedies when the inflammation was proceeding to effect serious organic changes in the transparent textures of the eye; and the arm would be the selected situation when the mischief was trifling and did not require to be more promptly and directly interfered with, or where a disposition to relapse evidently remained after many relapses had previously occurred. And here let me remark that the formation of an issue would operate equally as a means of cure and of prophylaxis. There are of course other modes of producing counter-irritation, and many surgeons prefer the use of tartarized antimony so as to excite pustules upon the skin, or the occasional use of a moxa, but I am not acquainted with any merits they possess, in these cases at least, which are not also possessed by blisters, setons and issues. Let me again assure you that the remedies in question will rarely disappoint your expectations if employed at a proper season and placed in a suitable situation. The skin of some scrofulous patients is so susceptible of irritation that it will not endure the contact of a blister, or the cervical glands may be enlarged and present an objection to such a mode of producing counter-irritation, or there may be extensive cutaneous eruption, an abcess, or a strumous sore in some part of the body which would of course supersede the necessity of exciting irritation by artificial means; these and many other circumstances which your inquiries will detect, will not only point out to you the necessity of adapting and modifying the particular variety of irritating remedy you ought to employ, but will also assure you that in certain instances, superficial irrita-

tion already exists on a very extensive scale and cannot therefore require to be increased by artificial means.

Lotions and Fomentations.—You cannot cure strumous ophthalmia merely by lotions and fomentations, although they will often diminish inflammatory action, lessen irritability, or relieve pain. When there is much inflammation present, the goulard water will be a very suitable application; if there is not much irritability, the zinc, or some slightly stimulating lotion will be highly serviceable; and if there is much pain, a lotion consisting of an aqueous solution of opium, or a small quantity of the extract of belladonna or of hyoscyamus dissolved in water will diminish its severity. If the pain in the eye be attended with much spasm either of the muscles of the eye-ball or of the lids,* warm fomentations will be useful; and you may direct your patient to bathe the eyes frequently with a soft sponge dipped in tepid water, or to steep a piece of flannel in a strong decoction of poppies, and very often apply it to the eyes. The following plan has been frequently adopted with considerable relief under such circumstances: —direct your patient to procure a large basin of warm water, into which put a little of the vinum opii, and let him bathe the eye at intervals for a quarter of an hour or longer, holding a large soft sponge soaked in this liquid to the eyes for many minutes together, but not employing friction by rubbing or pressing it upon the palpebræ, for nothing is more injurious to an inflamed eye than much friction or pressure of the lids. These are the usual means of effecting all

* Professor Koreff directs a strong solution of borax (two ounces to one ounce of distilled water) to be applied to the eyes by means of compresses of fine linen, whenever the *blepharospasmus* and *photophobia* are unusually severe. I have acted on his suggestion with great advantage on many occasions, and can strongly recommend the local remedy advised by my experienced and distinguished friend.

that can be accomplished by the aid of lotions and fomentations, and although I have enumerated but a very small number of those sometimes recommended, you will find them amply sufficient for the purpose without being confused and bewildered by selecting from a vast number, whilst any one of them will be almost equally beneficial.

These are the remedies, modified it is true by the admixture of various useless or disgusting substances, upon which practitioners of "olden times" chiefly relied, and upon which those uninformed and knavish *professors*, termed "eye doctors," of the present day still depend, but you will remember that the mode of effecting a prompt and permanent cure of a disease dependant on a depraved or shattered state of the constitution, is, to alter and amend that habit of body, and that condition of health, which, so long as they remain, will prevent any remedies of a strictly local nature, from effectually removing any present attack of inflammation and of affording security against its immediate return.

Scarifications.—You may perhaps be surprised to hear me allude to scarification of the mucous lining of the lower lid as one mode of relieving strumous ophthalmia, but although I am not prepared to recommend the scarification of the conjunctiva in these cases, it has been advised on such good authority that it would be improper to pass it over without some inquiry respecting its claim to notice. In order to appreciate its pretensions to value it will be right to review the ordinary condition of the conjunctiva during an attack of strumous ophthalmia, and then to revert to those occasional symptoms which may appear to call for a remedy whose action is as strictly local as any local remedy can be. You will remember that the state of the conjunctiva is not much altered as regards its vascularity, and that the intolerance of light is a very promi-

nent symptom; what benefit, under such circumstances, can scarification effect? Sometimes there is a pencil of large vessels, at the extremity of which, or, at least, at the visible termination of which, there is a pustule or phlyctenula; now here you might think the division of one or all of the large vessels constituting the fasciculus might be advantageously accomplished; but I can assure you that if you do divide them you will prevent the pustule from undergoing that process of reparation which is essential to the establishment and advancement of the reparative process, for this bundle of vessels is engaged in a very necessary and useful occupation. But there is still another state in which the utility of dividing one or more enlarged trunks, or of scarifying the lids is entitled to some consideration; I allude to that condition of chronic disease in which the vessels of the conjunctival surface of the lids have been somewhat enlarged for a long time, either from the attack of ophthalmia being less distinctly and definitely scrofulous than ordinary, or from the degree of vascularity being greater than is usual, and also to that permanent enlargement of one or more vessels which are engaged in repairing a pustule of large size, and which, in consequence, have experienced that extreme and prolonged distention which has so far destroyed their tonic properties as to prevent their contraction to their original size when the necessity for their enlargement ceased to exist. In the former case a few scarifications of the conjunctival surface of the lower lid will be useful; and in the latter instance, the division, or what is better, the excision of a small portion of the enlarged vessel will be highly advantageous. It may be raised with a forceps, and with a fine pair of scissors, the blades of which are convex towards the eye-ball, the length of tube required may be cut out with a very small quantity of that part of the conjunctiva which covers it.

Stimulants.—Local stimulants have recently been much used in the treatment of diseases of the eye, in consequence of the urgent recommendation of several distinguished writers in this department of knowledge, and it is to be apprehended that they are too frequently employed, and without a due discrimination of the cases in which their employment is likely to be beneficial, and the time at which they may be advantageously used. Having selected a proper case for the employment of any particular local stimulant, you would not forget that there are certain preliminary measures requisite to promote its safe and useful operation; for instance, the bowels should be well opened previous to its employment, and the active state of inflammation subdued by bleeding, and the constitution tranquillized by general treatment. Presuming that all this has been well attended to, and that there be neither pustule nor ulcer present, but merely a slight amount of vascularity and an intense degree of irritability and intolerantia lucis, what description of local stimulant would you employ? If you consult books you wil be surprised at the extreme fondness of particular writers for particular remedies, and I might present you with a long catalogue of such remedies, which from their equality of excellence would defy selection on the ground of real or reputed superiority, but you will perhaps be content if amidst such a diversity of opinion, I present you with the mere product of my own experience. In the case in question no remedy affords so much relief as the vinum opii dropped into the eye every night and morning;* you will be surprised to observe the relief this remedy procures, and the capacity the patient acquires soon after its use, to open the eyes and face the light, and you

* I have mentioned in a preceding page a valuable application suggested to me by Professor Koreff.

will often be requested by the friends of children to furnish them with some of these strengthening drops for the eyes after they have once witnessed their effect; for they imagine that the drops actually make the eyes stronger, because they can open them more freely and consequently see more clearly for a certain period after their use. Do not, however, recommend them to be frequently applied, nor used for a long period, for the frequent use of stimulants to the eye not only renders such applications scarcely at all serviceable when actually and urgently required, but has a tendency to render it irritable and unduly vascular from very trivial causes, and very often establishes chronic disease with permanent enlargement of the superficial vessels, and a disposition to entropium.

When small pustules or phlyctenulæ are present either upon the conjunctiva or the cornea, the solution of the nitrate of silver is a very useful application, and it may be dropped into the eye every night and morning by the patient's friends; but, if the pustules of the cornea have degenerated into ulceration, or if ulcer of the cornea be combined with strumous ophthalmia; that is, if the cornea become affected with a primitive ulcer of a large size with a languid appearance and a disposition to spread, you would not only carefully employ the constitutional treatment previously recommended for such a state of things, but, with a piece of the solid nitrate of silver worked to a very fine point, touch the ulcer itself, and repeat this application either every day or every other day as circumstances might require, taking care of course to limit the application to the ulcerated surface and to be dexterous and expeditious in its use. But if the ulceration has penetrated the anterior chamber, and the iris has become entangled in the aperture, you would not use the solid caustic but the strong solution of the nitrate of silver, and

at the same time apply the extract of belladonna upon the eye-brow every night and morning with a view of enlarging the pupil and withdrawing the entangled iris from the ulcerated aperture; and as it may be requisite to apply this extract for some time, it would be advisable to vary a little the situation in which it is placed, so as to retain the power of continuing its use as long as symptoms may render it necessary. I know this part of my observations will be objected to by some practitioners, but I cannot consent to relinquish my opinion. If you apply the belladonna to the forehead, immediately after the iris becomes prolapsed from the penetration of the whole of the layers of the cornea, you may perhaps, (and particularly if you at the same time drop upon the protruded iris a rather strong solution of the nitrate of silver) disentangle it and withdraw it from the aperture, but if instead of using the solution you were to touch the part with the solid nitrate of silver, the part touched would perish to a certain extent, and in my opinion the iris would be much more likely to adhere to the cornea than if no such remedy had been applied.

General directions.—It will be right in all cases of strumous ophthalmia where the intolerance of light is very great, to protect the eye from its too powerful influence, and this is best accomplished by requesting your patient to remain at home during the middle of the day; to darken his apartment; and to wear a green shade. You would not recommend either a tight bandage around the eyes, or a fold of linen to be suspended before them, as, in so doing, you would not only prevent the surface of the eye from being exposed to the salutary influence of the air, but also interfere with the natural evaporation which is constantly taking place from that part under ordinary circumstances, and you would heat the eyes by the artificial warmth such

bandages would yield. A shade of a green or blue colour is much better suited to these cases, and, as a piece of thin pasteboard is at once light and flexible, and is easily procured, it is quite as suitable as a more expensive apparatus. For the same reason you would attend to your patient's position in bed, and not permit him to lie either with the head on a level with the body or the face buried in the pillow; but on the contrary, request that the upper part of the body may be raised much higher than its lower part, and direct the friends or parents of your patient to prevent him as much as possible from lying upon the face.

Among the causes of strumous ophthalmia I mentioned teething, and also the existence of worms in the alimentary canal, and I remind you of these facts in order to impress upon your attention the necessity of inquiring into the probable existence of either of these sources of irritation and exciting causes of disease, with a view to the adoption of the usual treatment for their removal. If you believe that the pressure of a tooth upon the gum is productive of material irritation, you would of course lance it most freely; if you believe that the existence of worms either in the stomach or the intestinal canal, excited much irritation, you would employ the usual remedies for their destruction and expulsion, and employ them without delay as essentially necessary to enable you to arrest and remove the inflammatory condition of the eye. And let me remark that this strict inquiry after causes is a matter of the highest importance, inasmuch as, you may, by means of such inquiry, often discover some minor source of mischief which would have been completely overlooked if you had remained satisfied with the detection of some perhaps more important source of excitement and irritation; for although you will in many instances discover some para-

mount cause of excitement and irritation, there will often be present many minor and less important sources of mischief which will be sufficient to retard, and in some instances to baffle your curative efforts.

You will frequently be consulted by the parents of children on account of relapses, and if your treatment be conducted solely with the view of removing any particular attack of scrofulous ophthalmia, without effecting some amendment or producing some permanent alteration in that condition of constitution or that state of health which has given rise to it, you will be mortified to find that the cure you have wrought will be only of a short duration. It is admitted by all surgeons that this disease has a most vexatious propensity to recur, as soon as, or soon after it has made its lingering exit, and in this way it has continued to recur and to relapse until the unfortunate subject of it has either had his vision much impaired or altogether destroyed, and, at all events, it has prevented him from employing those years in the acquisition of knowledge, which (I am referring to the early period of life) are so admirably adapted to its acquirement, and to the attainment of which his mental powers are generally fully, and more than usually, adequate. The prevention of relapses then becomes a matter of the highest importance, and you must permit me to repeat what I conceive to be the best means of correcting this tendency to recurrence of morbid action.* Having directed your treatment to the removal of that

* "The management of scrofulous ophthalmia is chiefly prophylactic; and moderate exercise in the open air, sea bathing, chalybeate waters, and the use of a mild nutritive diet, are the points chiefly to be attended to." Edmonston. *A Treatise*, &c., p. 270. "The tendency to scrofulous diseases of the eye is demonstrated before they exist, and to prevent their recurrence is often more difficult than to remove them." Travers. *A Synopsis*, &c., p. 263. "No disease is so apt to recur as scrofulous ophthalmia." Mackenzie. *A Practical Treatise*, &c, p. 400.

state of constitution which predisposed to the original attack, you would afterwards continue to employ your tonic remedies for some time after the removal of the ophthalmia; you would insert an issue in the arm; direct your patient to avoid every source of gastric and intestinal irritation; prescribe the strictest rules for the regulation of the diet and the management of the various other habits; and, as circumstances might require, recommend change of air and alteration in clothing, and strictly warn your patient against sustaining the chilling influence of cold; and for this purpose to wear that kind and that amount of clothing which will be sufficient, by the aid of exercise, to prevent any great degree of chilly sensation. In mentioning these means of perfecting and maintaining a cure, it is impossible to do more than lay down the *principles* by which your conduct should be regulated; for, if I were to give a moderately complete enumeration of the individual remedies requisite for particular cases, I should very much, and, as you may be disposed to say, very needlessly prolong my remarks.

The slight and chronic form of ophthalmia, the tinea, the irritation and thickening of the tarsal margins, and the other affections of the eye and its appendages which are connected with scrofula, remain to be discussed.

SECTION IX.—IRRITABLE OPHTHALMIA.

The conjunctiva is subject to a form of inflammation which I shall term irritable, because it is characterized by irritability and uneasiness rather than by acute inflammatory action and severe pain; and also because it takes place under circumstances which indicate an irritable con-

dition of the system. It is a disease to which women are very liable during suckling, particularly if they have continued to nurse their children for a longer period than is proper and natural, and more especially if the same thing has been practised on many former occasions. It is generally supposed that suckling prevents impregnation; women among the lower classes of society believe that whilst they continue suckling they cannot become pregnant, and on this account they often continue to nurse their infants for a very long period, until indeed, in many instances, *irritable ophthalmia* or *amaurosis* takes place.

The irritable ophthalmia from suckling presents us with one of the best illustrations of this disease of the eye, and to it therefore I shall in a great measure confine myself whilst pointing out its symptoms.

If you examine the eye of a woman affected with irritable ophthalmia, without touching the lids, you will perceive that the tarsal margins are red and inflamed, and that they are much redder and more inflamed towards each canthus than at any other part (ophthalmia angularis); the lachrymal caruncle in particular, will be much larger and more florid than usual; there will be a little glutinous discharge upon the tarsal border, and unless it be frequently removed, it will evidently collect at the inner canthus; there will also be some degree of epiphora, from the inflamed state of the margin of the puncta, and a little intolerance of light. The lids will acquire some degree of irritability, they will be continually quivering as though the orbicular muscle were undetermined in its action, and rapidly, though only partially, contracting and relaxing in frequent succession; that closure of the lids by means of which the lachrymal secretion is equally diffused over the surface of the eye, is effected very frequently on account of the collection

of the tears at the inner canthus from the spasmodic closure and inflamed state of the margins of the lachrymal puncta.

Irritability of the puncta and inflammation of their margins, leads, it is presumed, to that state of epiphora which in this form of disease is almost invariably present to a considerable extent; for we do not find that the lachrymal secretion has undergone that change either in its quantity or its qualities which would give rise to the accumulation in question.

If a more particular examination of the eye be instituted it will be found that the vessels of the palpebral portion of the conjunctiva are much enlarged, there is not however that diffused blush noticed in some other forms of conjunctival inflammation, by which its whole surface acquires an equally red and vascular appearance, but the redness is linear and partial, depending in a great measure on the enlargement of some of the more considerable branches of the conjunctival vessels, which in many instances may be accurately traced upon its surface. It will be also remarked that the junction of the skin and mucous membrane, that part at which the one gradually and almost imperceptibly acquires the characters of the other, is much involved in the mischief; it is extremely red and inflamed, and the secretion from the meibomian glands which are situated so near to it, is altered—it is no longer mild and quite fluid, but tenacious and irritating. This inflammation does not often extend to the sclerotic conjunctiva, it is in many instances limited to that of the palpebræ.

The sensation of sand beneath the lids is a very troublesome symptom of this irritable ophthalmia, as may be supposed from what has been said respecting the enlargement of the vessels on the palpebral portion of the conjunctiva; there is likewise much smarting and itching, a sense of

stiffness of the lids, and a difficulty in separating them after they have been a long time closed; the smarting and itching are much increased towards evening, particularly if the patient has been occupied during the day at any employment requiring minute vision, or been engaged in working at brilliant objects, or by candle or gas light, or been much exposed to the dazzling rays of the sun. Sometimes the eye-lids are a little swollen, there is present in fact a slight degree of œdema of the palpebræ.

Irritable ophthalmia is sometimes attended with a slight dimness of vision, and indeed many patients who have disregarded the inflamed state of the eye, are alarmed at the altered condition of their vision. In such cases your treatment like your prognosis should be marked by the most extreme caution, for it may happen that the injury to vision has become too firmly established to be wholly removed, and if calculating on the subsidence of the amaurotic symptoms on the cure of the external inflammation, you were to pronounce a favourable opinion without *any* qualification, your professional reputation might be seriously injured.

The red and inflamed state of the tarsal margins, and the increased degree of this condition at and towards the canthi, is so very characteristic of the malady, that you can scarcely ever be mistaken as regards its diagnosis; but if you combine with this circumstance the peculiarity and extent of the inflammation of the palpebral portion of the conjunctiva with the nearly pale and healthy condition of its sclerotic division, and the absence of much increase of meibomian and conjunctival secretion, and if you are satisfied that your patient has continued to suckle longer than is usual, and if she tells you that this diseased state of the eye came on whilst nursing, you will not be at a loss to distinguish this form of conjunctivitis from its other varieties.

If it should appear to arise from prolonged suckling, or from any other clearly ascertained cause, the removal of that cause will alone be, in many instances, sufficient to effect a cure; but even if this should not take place, it is very manageable by the adoption of suitable remedial measures, and you may therefore very generally pronounce a satisfactory opinion respecting the result of such cases; bearing in mind however, 1,—that if it have appeared on many former occasions it may have effected those changes in the state of the conjunctiva which may never be perfectly removed; 2,—that if it be allowed to continue, it may extend, and eventually involve more important structures; and 3,—that it may be combined with or succeeded by amaurosis, of the approach of which, indeed, it would seem to afford in very many instances, a timely and salutary intimation.

Before I explain the causes of irritable ophthalmia, I could wish to inquire, what is the nature of that action by which this morbid condition of the eye is connected with the process of suckling? And why should long-continued suckling affect the conjunctiva in this particular manner? It may be said that this state of disease is intended to arrest attention, by which the occurrence of one of a more formidable description may be averted; but the mere declaration of a fact does not explain it. In the absence of any especial sympathy, or any direct nervous or vascular connexion by which the nature of this occurrence may be elucidated, I have been led to imagine that the continuance of suckling for a long period, especially in women who have suckled many children previously, produces a general derangement of the health to which the origin of this disease may be fairly attributed. Derangement of the health of a particular description is prone to excite in some individuals disease of the eye of various

kinds, and I am satisfied that irritable ophthalmia may arise from this cause quite independently of suckling, from repeated observation of the fact, although it is much more frequently noticed in connexion with lactation.

Long continued suckling and a disordered state of the general health, constitute the only causes of irritable ophthalmia with which I am so far acquainted as to speak at all positively with regard to them, but although I have never seen it unassociated with one or other of these states, it has appeared, in some instances, to receive as its immediate or exciting cause (in connexion with that disordered state of health, which may be termed its predisposing cause,) various sources of external irritation; such as, prolonged application to minute bright objects of the same size and colour; working very closely by gas-light, &c. The eye requires relief like other parts; it requires that the objects upon which it is engaged should be occasionally varied.

Treatment.—If a female who had never had a similar disease on any former occasion, were to apply to you with irritable ophthalmia, which had come on during the period of lactation, and if on inquiry you found that she had had many children in rather quick succession, and if she had continued to suckle them beyond the usual period, you would at once direct her to wean the child; and you would urgently insist upon the imperative necessity of this measure without further delay, if any degree of dimness of vision, any symptoms of amaurosis, however slight, were present. At the same time you would direct her to use the zinc wash frequently, to apply a blister to the nape of the neck, to take some mild aperient medicine, and to smear a little *unguentum plumbi* upon the tarsal margins every night and morning. But, in such case, you would personally explain to her the mode of using the

ointment and the importance of using it properly. Let a little of the ointment be rubbed in the palm of the hand with the tip of the finger until it becomes liquid, then let the extremity of a fine camel hair pencil be smeared with it, and having separated the lids, draw the pencil covered with the ointment, gently along the inclined edge of the palpebral borders, and in the evening direct her to place a small portion of it at the inner canthus and to allow it to remain in that situation until it is dissolved. Unless you accompany your prescription with directions of this description, the ointment, which is no unimportant part of the treatment, will be of little or no service, for patients generally content themselves with rubbing it upon the cutaneous surface of the lids from an ignorance of the mode in which it ought to be used.

There is one other remedy which is of some importance as a means of relieving that tingling smarting sensation, and that spasm of the lids, which as I have mentioned, are sources of considerable uneasiness, I mean the vinum opii; let a drop or two of the vinum opii be introduced between the lids every night and morning, and if it be thought too painful a mode of purchasing relief, you may direct the eyes to be frequently fomented with a decoction of poppies or an aqueous solution of opium. This is the general treatment of slight cases when they occur in women during the period of suckling, such inflammation never having appeared on any former occasion; but the inflammation may be very severe, and the degree of pain so considerable as to forbid the use of these stimulating remedies, you would therefore commence your treatment by the application of a few leeches beneath the tarsal margin of the lower lid or lids (in nearly every instance both eyes are affected) and instead of the zinc lotion and vinum opii, you would prescribe the goulard water and the decoction of

poppies, or the aqueous solution of opium; at the same time acting more freely upon the bowels than in the former instance, advising as a measure necessary to permit the employment of proper remedies, the removal of the child; of course unless the child be weaned without further delay, the cause of the disease will remain, and you will be prevented from adopting that active kind of treatment which the condition of the eye may require, from a very proper apprehension of its injurious influence upon the infant. Sometimes the disease of the eye does not appear during the period of suckling, but soon afterwards, and in such cases it rarely requires medical treatment, but if associated with debility, a little tonic medicine may be advisable. Men are liable to it from working at particular employments as we have previously mentioned; such instances require particular investigation, and having satisfied yourself with respect to the cause of the mischief you would adapt your curative measures accordingly; and generally speaking the same medical treatment is necessary as for the management of irritable ophthalmia from suckling. Having removed the cause, that is, the local source of the mischief, you would in slight cases adopt the stimulant, and in severe ones the soothing and depleting mode of treatment. The latter stages of the disease may sometimes require the use of a more active stimulant than zinc wash, such for instance, as the diluted nitrated ointment, applied in the manner recommended for the use of the lead ointment, except that you would not judge it necessary to leave so large a portion of it for gradual solution at the inner canthus; indeed this latter remedy is in my opinion extremely serviceable, not only in the latter stages of the affection, but also in that chronic form of the disease which sometimes remains after it has been permitted to continue in its acute form for a long period, or in those cases in which this disease of the eye

has repeatedly occurred. Enlargement of the vessels of the conjunctiva and an uneven granular condition of its surface, present the only injurious consequences it is prone to produce, and are always much benefitted by the application of this ointment.

I have stated that amaurosis is sometimes combined with irritable ophthalmia, and that the latter disease may be regarded as a monitory warning of the probable occurrence of gutta serena, but the nervous affection is to be considered as a distinct and separate disease, and treated in a totally different way from the inflammatory mischief, with which indeed it has no connexion, except inasmuch as they are equally produced by the same cause; they do not influence and react upon each other, they do not modify and aggravate the symptoms peculiar to each form of disease.

There sometimes remains a state of tinea, which is easily corrected by the remedies adapted to that affection occurring under other circumstances; it is not necessary to adopt any kind of treatment different from that required when tinea arises from other causes. Of course I do not now refer to that red and irritable state of the tarsal margins so remarkably evident towards the angles of the eye at the commencement of every case of irritable ophthalmia, but to a mere state of tinea consequent on the prior existence of the disease under consideration.

SECTION X.—ERYSIPELATOUS OPHTHALMIA.

The conjunctiva being a continuation of the skin of the eye-lid, though very different in its anatomical characters, is much more intimately connected with and influenced by its condition than any other part of the eye. It fre-

quently becomes red, irritable, and inflamed, during the progress of various diseases in which the skin is either in an eruptive or an inflamed state; and I shall presently describe three separate forms of inflammation with which the conjunctiva is affected, simply in connexion with, what are termed, "the exanthemata."

I believe BEER first described the ophthalmia, the details of which I shall now proceed to explain, and you will do well to read his account of it, for if it be not absolutely correct, it exhibits for the most part so clear a view of the disease, and is conjoined with so many practical and original observations, that you cannot fail to be benefitted by the perusal.

I shall now describe the symptoms of erysipelatous ophthalmia in its various stages, marking its progress by the recital of those additional occurrences which, from a variety of causes, occasionally take place. The earliest symptoms of erysipelatous ophthalmia are, a slight redness and tumefaction of the conjunctiva, attended frequently with a red and swollen state of the palpebræ; there is also a sense of itching and smarting, but not that *kind* and that *amount* of pain which accompanies many other forms of conjunctival inflammation. By degrees the redness increases, and assumes, not indeed the bright scarlet hue which is generally produced by an inflammatory state of the conjunctiva, but it is of a dusky yellowish-red, the conjunctiva is elevated by serous effusion from the sclerotica, and this elevation is particularly apparent around the cornea where the connexion of parts becomes suddenly most intimate; very commonly small yellowish vesicles will form in this situation, but they are distinguished from the phlyctenulæ which sometimes occur in the pustular inflammation of the conjunctiva, by their colour—the nature of their contents—and by the state of the sur-

rounding portion of the conjunctiva. The last stage—that in which the symptoms are developed to their utmost extent—will be accompanied by an increase of all the previously enumerated symptoms; the smarting and itching will be very troublesome, and the prominent state of the vesicles will often occasion great inconvenience; the yellowish-red state of the conjunctiva will be almost uniformly great throughout the whole extent of that membrane (excepting where sanguineous effusion has taken place, forming subconjunctival ecchymosis); the œdema will be so much increased that a portion of the morbid conjunctiva will cover or overhang the circumference of the cornea like a bag of water or a semi-transparent gelatinous substance, particularly at its lower part, where as an effect of gravity, a large proportion of it will collect and accumulate; but a small portion of the *entire circumference* of the cornea will, in severe cases, be covered and concealed by the tumid and infiltrated conjunctiva; the *appearance* of the whole of the front part of the eye will be watery, and on moving the lids and with them the conjunctiva in one direction, and at the same time requesting the patient to look in an opposite direction, the separation of the conjunctiva from the sclerotica will be sufficiently evident. This watery *jelly-like* state of the surface of the eye cannot readily be confounded with any other form of disease to which that organ is liable.

The tarsal margins will become agglutinated by the altered state of the meibomian secretion, the palpebræ will often be much swollen, in short they will sometimes be in a state of erysipelatous inflammation, and there will also be a certain degree of intolerance of light and an increase of lachrymal secretion.

The constitutional symptoms usually attendant on erysipelatous ophthalmia are, a deranged condition of the ali-

mentary canal, defective appetite, a furred tongue, with a variable amount of feverish disturbance. This disease usually attacks persons either at the middle or at an advanced period of life, and not unfrequently re-appears after it has been once removed if the constitutional condition of the patient be not improved, and the local circumstances (if any such exist) producing an injurious effect, be not discovered and obviated. Persons obnoxious to erysipelas are also more than others liable to erysipelatous ophthalmia, and it sometimes attends or succeeds an attack of erysipelas of the face.

Treatment.—Erysipelatous ophthalmia, is essentially dependant on the state of the constitution, and therefore the only correct basis of rational treatment must comprehend such measures as will remove or alter that state of the general health or that disordered condition of the alimentary canal on the existence of which the local malady mainly depends.

The symptoms of erysipelatous ophthalmia are neither of so severe nor of so actively inflammatory a nature as to render free depletion either advisable or necessary; but as there are present decided indications of disorder of the alimentary canal, that circumstance affords an obvious and prominent indication of cure. Active purgatives will be extremely requisite, and I should advise you to combine with them a small quantity of tartarized antimony —say, a few grains of blue pill with the compound extract of colocynth, and a small quantity of tartarized antimony, made into pills, and taken and repeated at such intervals as may be necessary to keep the bowels freely relaxed. At the same time regulate the diet, that is, of course, important, prohibit wine and spirits and meat, and substitute for them weak animal jellies, light puddings, plain biscuits, and so on. But do not neglect to take advantage of any

and every indication which may occur in the progress of each case, nor fix upon any one set of remedies as being universally adaptive, but here, as in the management of every other disease, modify your treatment and vary your remedies as circumstances may require.

The local remedies may consist either of the zinc wash, or if the œdema be considerable, drop into the eye twice a day a little of the vinum opii or some other stimulating remedy. If there be much smarting and itching with more irritation than usual, bathe the eyes frequently with a fomentation of poppies or some warm anodyne liquid. If the meibomian secretion be very abundant and viscid, direct your patient to smear a little of the unguentum plumbi along the tarsal margins every night and morning, and employ blisters or some other mode of producing counter-irritation as circumstances may direct. There are many cases in which it would be scarcely advisable to blister the skin on account of its tendency to become, under such circumstances, extensively inflamed from a very slight degree of irritation, and in such instances and generally in those also where erysipelas of some portion of the skin actually existed, or had recently existed, you would be reluctant to employ vesication as a means of producing relief. If you will bear in mind that erysipelatous ophthalmia frequently depends upon and is always much influenced by the disordered state of the constitution, and that that disordered state consists for the most part in a disturbed condition of the digestive apparatus, you will know on what *principles* to act and how to treat the disease in as successful a manner as the nature of the case will permit. Local treatment is in the general comparatively unimportant.

I should mention that this disease sometimes admits of relief *only* through the medium of constitutional treatment,

and that whilst a certain state of health, or a given condition of the stomach and bowels remains (which it is by no means always easy to remove), the disease of the eye will not undergo any amendment. The disposition to relapse is also considerable, and indeed, speaking in reference to many instances of this malady, I may state, in the language of SAUVAGES, " morbus est pertinax et curatu difficilis."

SECTION XI.—VARIOLOUS OPHTHALMIA.

The eye is frequently affected during an attack of small-pox. Sometimes the conjunctiva is merely slightly inflamed, sometimes the eye is irritated by the formation of pustules on the tarsal margins, but more commonly pustules form upon the cornea; and all these occurrences may take place during and coeval with the existence of small-pox; but pustule and ulcer of the cornea and even ophthalmia may take place after the small-pox has declined—that is, during convalescence. When a small pox pustule forms upon the cornea it gives rise to a series of evils which will be presently described in detail, and when mere ophthalmia unconnected with the formation of pustule takes place on the subsidence of the exanthematous affection, it is pretty much the same as the inflammation of the eye consequent on measles and scarlet fever, and is very often determined in its occurrence by a scrofulous state of constitution. It is important to notice the distinction between the ophthalmia consecutive to small-pox, and that produced by the formation of variolous pustules at some part of the anterior surface of the eye-ball.

Before I enter upon the discussion of the primitive and secondary disease of the eye as connected with small-

pox,* I must be permitted to allude to one popular source of error as associated with this subject. You very often hear persons say that children recently affected with small-pox have recovered their sight after having been blind many days, and you will understand by this (not indeed what they believe) that the tumefaction of the lids combined with the adhesive secretion from their edges has prevented them from being so far severed as to admit the light, and that such patients have been blind, or in other words, their eyes have not been sensible to the light, merely because their lids were swollen and closed. In many of these cases this is really all that takes place, and as soon as the swelling of the eye-lids subsides, and the adhesive mucus which has been permitted to collect and to become indurated and eventually to agglutinate them with considerable firmness, has been softened and removed, the patient will open the eyes and see as well as usual; this however is not always the case, and I proceed to point out those symptoms which would indicate the existence of more important mischief. Let me advise you not to permit the meibomian secretion to collect, (as is too frequently done) for, if you do, in the event of the patient's recovery he will be likely to suffer from the permanent

* "Quando in ægrotis variolarum morbo adfectis oculi inflammatio suboritur, vel singulas oculi partes, vel totum etiam bulbum adfectura, ophthalmiam variolosam adesse judicamus. Malum vario suboritur morbi tempore, varias adoritur oculi partes, et exinde vehementiam ejus et periculi cum ipsa juncti gravitatem medici observarunt diversam." BENEDICT, §. 365. "In a great proportion of cases of ophthalmia *consecutive* to small-pox, loss of vision is the result." LÉVEILLÉ. "Variolous ophthalmia is an inflammation without pustules, which appears during the variolous eruption, and often *after the complete desiccation of the pustules on the skin*." GUERSENT. "La période *chronique* de l'ophthalmie *aiguë* par métastase varioleuse aux yeux n'est pas moins opiniâtre que l'ophthalmie *chronique* scrofuleuse: je veux parler de celle qui survient à la suite de la petite vérole, et souvent quelques semaines après la chute dis croûtes." LÉVEILLÉ's translation of SCARPA, T. 1. p. 258.

loss of many of the ciliæ, or from a state of tinea which may be very tedious in its duration, besides the irritation the eye will necessarily sustain from the lodgement of the discharge upon its surface. By simply bathing the parts with a little warm milk and water several times a day, you will not only diminish the swelling of the lids, but avert those *immediate* and *remote* consequences which are so apt to arise if attention to this apparently trifling circumstance be neglected.*

It has been stated that the conjunctiva may be simply inflamed in consequence of an attack of small-pox, and if pustules form, as they frequently do at the edges of the lids, this inflammation will be much increased. The consequences of the formation of pustules at the tarsal margins will be, great tumefaction of the neighbouring parts, change in the meibomian secretion, and acute conjunctival inflammation; and will require the adoption of the same remedial measures as acute inflammation of that membrane arising from any other cause. But if the small-pox be from its severity obviously fatal, if the vital powers are much depressed, you would not think of employing active treatment; and as the remedies for the cure or relief of the small-pox itself would be of chiefest importance, you might not be able to use the necessary constitu-

* On account of this disease (ophthalmia variolosa externa) frequently terminating so fatally, it has not been deemed sufficient merely to cure it, it must be prevented when possible. To the prophylactic remedies celebrated for this purpose, belong particularly compresses, smeared with Camphor, and hung over the eyes, also a solution of eight grains of Sugar of Lead, in two ounces of Rose-water, with which the eyes are to be often moistened by means of compresses, and lastly, Lard, which is to be applied over each eye. The employment of these means however will be very seldom necessary in the variolous disease, now progressively diminishing in the frequency of its occurrence. Monteath's translation of Weller's *Manual*, &c., Vol. ii. p. 233

tional remedies for the ophthalmia to the usual extent; and the state of the skin would of course prevent you from employing counter-irritation, so that your remedies would be in such case almost entirely confined to those local means which consist of applications to the eyes themselves. You would direct a fold of linen to be placed upon the eyes, and to be soaked either in warm goulard water, or milk and water, and you would further direct that the edges of the lids be anointed with the unguentum plumbi, and if any pustules existed on the tarsal margins, you would open them with a fine needle long before their period of maturation, discharge their contents, and afterwards apply the solid nitrate of silver, worked to a very fine point, over the central part of such pustules. But if there were no symptoms prohibiting depletion, you would bleed in such cases for the purpose of relieving the inflamed state of the eye just as you would do in any other similar case, regulating the freedom of your depletive measures by the degree of necessity for them as evinced by the inflammatory condition of the eye, and adopt in every respect the same treatment, modified only by the circumstances previously mentioned as connected with the more important malady.

If a pustule form upon the cornea* after the eyes have been for some days closed by tumefaction of the lids, you

* M. Guersent denies that small-pox pustules ever form upon the cornea. He says the variolous affection of the eye is an inflammation without pustule on the cornea. M. Serres states that when a small-pox pustule forms upon the cornea it is always at its lowest part, and he accounts for this by supposing that the inferior tarsal margin supports, and is touched by the upper lid, and that it alone is in contact with the surface of the eye; and he further states that when the pustules of the inferior palpebræ are removed by cauterization, none ever appear upon the cornea. *Gazette de Santé.* An old author (Permannus. *Chirurgia Curiosa*, p. 70.) has correctly declared that when small-pox pustules form upon the cornea, they are generally situated opposite or nearly in front of the pupil.

would be pretty distinctly apprised of its formation by the nature of the pain, even although you are unable to sever the lids so as actually to see it. The patient will suffer from a pricking, scratching sensation whenever the lids are moved, and will frequently point to the exact spot where the pustule is subsequently discovered to have formed; he will often complain of severe pain of the eye-ball, and will also complain of the uneasy and unpleasant sensation produced by increasing the light of his apartment. Such are the symptoms which would lead you to suspect the formation of a pustule upon the cornea in those cases in which the swollen state of the lids prevented you from obtaining ocular demonstration of the correctness of your suspicion. But it will sometimes happen that the progress of a pustule may be watched throughout its entire course, and it is from the observation of such cases that we are enabled to detail the symptoms by which it is attended, and the different appearances it assumes, not only in different cases but in the various stages of its existence; and lastly, the effects it has a tendency to produce.

The first decided indication of the formation of a pustule upon the cornea is a somewhat circumscribed whitish point, surrounded by a haziness of the cornea, with a slight degree only of conjunctival inflammation; this white point gradually extends, as well as the surrounding haziness, until the whole cornea assumes a dull cloudy appearance, except at its central part, where it retains a densely white aspect. At the same time the conjunctiva is much inflamed, the sclerotica and the deep-seated textures of the eye soon become involved, and if the mischief be not arrested, hypopion is produced, and this hypopion may be owing to the gravitation of the contents of the pustule and part of the interlamellar deposition of the cornea, which has burst into the anterior chamber, or it may be a secretion from

the inflamed surface of the membrane of the aqueous humor. If the disease be uncontrolled, the contents of the pustule of the cornea may, as I have stated, be discharged into the anterior chamber, or the pustule may burst externally, which occurrence will be followed by those immediate and remote consequences which a pretty extensive aperture through the whole of the corneal lamellæ is so well known to produce.

Before I proceed to consider the terminations of this disease, and its treatment, I must allude to the secondary affection of the eye as occasionally connected with small-pox. When the severe symptoms of small-pox have subsided, and the patient is fast recovering, the eyes, which have previously been free from material disease, will in some instances become inflamed, and this inflammation may be simply the result of sympathy on the part of the conjunctiva with that irritation to which the skin has been for so long a time exposed, and that deterioration in the condition of the constitution, the disease (small-pox) and the treatment necessary for its cure have conjointly produced, and may consist of simple ophthalmia; or a pustule may form upon the cornea in one or more situations, as may be seen by the white points or spots which will correspond with the number of pustules. The same extension of the white central part with surrounding haziness will take place here as in the former case, until the whole cornea will become involved; and the termination will also be the same. The colour of these pustules is at first white, they begin as a small white cloudy point, this white point deepens in colour at its most central part, its circumference being less densely white, and surrounded by a halo or diffused haziness, the extent of which varies with the mild or severe character of the pustule it encircles. Prior to its rupture

and the discharge of its contents, it assumes a dirty-white or yellowish tinge, and a portion of the cornea is evidently in a sloughing condition, or more correctly, in that state which immediately precedes sloughing.* The local symptoms are exactly the same as in the former case except that they are rarely so acute, in consequence of the diminished severity of the secondary affection of the eye as compared with its primitive form. If the disease extends to the deep-seated textures, it will be indicated by the usual symptoms, and as there is nothing to prevent us from ascertaining its true nature we shall of course be apprised of it by the customary examination of the diseased organ, and be prepared to act accordingly.

The inflammation of the eye unconnected with the formation of a small-pox pustule which occurs on the subsidence of the acute symptoms of small-pox is very properly attributed to the influence of that disease in disturbing the general health, and in interfering with the healthy function of the skin; but it is not perhaps equally easy to determine the cause of the formation of small-pox pustule upon the cornea, at such a period of the constitutional affection—that is, when the acute symptoms of small-pox are subsiding. If you imagine that in those instances in which the pustule forms upon the cornea at a late period, the low state of vascularity not only of the cornea itself, but also of the membrane which covers it, may have

* Of course I am not intending to confound a change which may take place in the proper structure of the cornea with an appearance produced by the deposition of a dirty-white puro-lymphatic matter between its lamellæ. The distinctions between the appearance produced by impaired vitality of the cornea, and an altered and somewhat similar *appearance* of that texture by the secretion of various morbid matters between its laminæ, will be fully explained in a subsequent *Section*.

retarded the developement of the pustule; if you are of this opinion (and I am really unacquainted with a more rational explanation of this circumstance) the occurrence is satisfactorily explained.*

Effects and modes of termination.—If small-pox does not actually lead to the formation of a pustule upon the cornea or to any structural change of any other important part, it often leaves the eye in an irritable condition and establishes a tendency to tinea—a very troublesome form of tinea; sometimes it excites scrofulous ophthalmia; but changes in the transparent textures of the eye and in its figure, are by no means infrequent consequences of the existence of severe variolous ophthalmia. The cornea and sclerotica are very liable to yield,† from the attenuation produced in the latter by inflammation, and by the weakness—the loss of resisting power—produced in the former by ulceration and suppuration, and the consequent destruction of its layers; but opacity only may remain,‡ or

* The circumstances which hasten or retard the developement of disease consequent on the application of contagious agents, are very imperfectly and insufficiently explained by medical and surgical teachers, though it is generally admitted that it is of great importance that they should be well known and correctly understood.

† A great majority of the cases of staphyloma noticed in children are caused by *purulent* or *variolous* ophthalmia.

‡ The opacity of the cornea consequent on variolous ophthalmia is very dense, of a pearly-white colour, and very definite in its outline. Its edges are not *shaded off* until they gradually merge into the natural texture of the cornea, but the boundary line of opacity which separates the healthy from the diseased portion of the cornea is strongly marked, and is as densely-white as any other part of the opaque cornea. Dr. Mead has particularly referred to the frequent occurrence of opacity of the cornea consequent on small-pox, and has felt it necessary to present his readers with a considerable number of *valuable* remedies, for its cure. He says, "with respect to the eye, the part on which the small pox broke out, has an opaque whiteness in it, as we have already observed. If this happens in the eyes of children, or young persons of a moist constitution of body, and tender skin, it will be the more easily deterged. Now the medicines, which deterge the eye, and take off the whiteness, are these: borax, or nitre made into cakes, Andarene

some other change may be wrought upon the cornea, which may impair or destroy its transparency. The formation of pustules upon the tarsal margins may occasion the production of cicatrices which, under particular circumstances, may render them uneven and excite some degree of deformity; and this can only be prevented by early puncturing the pustule and applying the solid nitrate of silver to the puncture as advised by VELPEAU and LISFRANC—thus diminishing its magnitude and obviating or lessening its tendency to induce inequality and irregularity of the tarsal border.

*Treatment.**—The treatment of ophthalmia consequent on small-pox will vary and may be conveniently divided as follows; *first*, the treatment of inflammation of the eye unattended with the formation of pustules; *secondly*, the treatment of primary pustule of the cornea producing or attended by severe inflammation of the eye; and *thirdly*, the treatment of the disease of the eye, as it occurs on the subsidence of the acute symptoms of the constitutional affection. With regard to the first,—that is, mere oph-

salt, sal-ammoniack, glass, the scoriæ of glass, coral, tutty, lapis hæmatites, verdigrease; bastard sponge, the sea crab, the dungs or excrements of sparrows, swallows, starlings, mice, bats, and of the Arabian or Lybian lizard; musk, the sediment of urine; the acorus, ebony, cornel-water, Arabian sugar, dregs of vinegar burnt, myrrh, sandaracha or juniper gum, commonly called varnish, gums of the olive and bitter almond-trees, and the milky juice of wild lettuce. (p. 380.) *Medical Works.* London, 1762.

* DR. ELLIOTSON has given a good account of small-pox in his excellent lectures delivered at the London University, but like all other medical lecturers who have preceded him, he has said very little respecting the affection of the eyes which so generally accompanies that malady, and has only referred to its treatment by stating "that it is certainly to be conducted altogether on general principles." His description of variolous ophthalmia is confined to an imperfect enumeration of a small number of its *effects*. DRS. CLUTTERBUCK and ARMSTRONG have said still less upon the subject than DR. ELLIOTSON.

thalmia accompanying the progress of small-pox—it has been already stated that it will be guided by those rules which would influence our treatment of the same inflammatory state of the eye occurring under other circumstances, only modified by the condition of the skin, the state of the system, and the treatment instituted for the cure of the more important disease. The management of pustule of the cornea* and the attendant inflammation, (for of course it could not exist without producing inflammation of neighbouring parts) will consist in the application of local stimulants, such as the nitrate of silver and the zinc lotion; in the removal of blood; and attention to the state of the bowels; and as soon as the pustule has burst and the process of ulceration has been arrested, the application of the nitrate of silver in substance will be of great service if used with caution—the ragged ulcerated surface left after the pustule has burst should merely be touched with it. But let me advise you not to administer mercury, for it is a very bad remedy for extensive ulceration (occurring under these circumstances) and sloughing of the cornea; its free administration would indeed, in this state of things, render the destruction of vision quite certain, and prevent the powers of the system from successfully interfering either with a view of retarding the progress of sloughing or of promoting the advancement of the reparative process. The same objections do not exist with regard to the moderate exhibition of mercury in those cases where the pustule arises after the severity of the small-pox has subsided, for as the pustule or pustules are

* Dr Weller advises that the small-pox pustules of the cornea be opened "before they fill," but I presume the practice he recommends is too palpably mischievous to be adopted by any of his readers. See Monteath's translation, vol. ii. p. 234.

in the latter case generally much smaller, are attended with deep-seated inflammation, (particularly inflammation of the iris) and also with hypopion, the action of the mercury would have a tendency to moderate the internal malady and promote the absorption and prevent the organization of the effused lymph or other inflammatory product, while it would exercise no importantly injurious influence upon the pustule of the cornea, which influence might not be counteracted by the aid of the local stimulants just mentioned for the cure of pustules which were simultaneous or nearly simultaneous in existence with the constitutional disease.

I have, in the course of my remarks, recommended and disapproved the use of mercury in ulceration and pustule of the cornea, and I shall explain why I have adopted these apparently opposite opinions. The cases for the cure of which I recommended mercury were those where the ulcer of the cornea was produced by inflammation, or where only a small pustule or ulcer of the cornea existed, as in those instances where they supervened upon a state of convalescence from small-pox, where the extension of the ulcer or pustule was much favoured by the inflammation they excited, and in every such instance the object of administering mercury comprehended the arrest of the inflammation, which, in the former instance, had produced, and in the latter case was increasing the mischief. But I have thought it right to warn you against the free exhibition of hydrargyrus where the ulceration has been so extensive as to have destroyed many of the superficial layers of the cornea throughout nearly its whole extent, or where the magnitude of a pustule had caused the death of so large a portion of the cornea that nothing but the most active local and general stimulation could present any reasonable chance of restoration and recovery. If you

reflect on the condition of these parts and the causes of that condition, in the two states in which I have judged it right to recommend what may be termed directly opposite treatment, you will probably feel assured that if the plan I have advised be not quite correct, it has not at least been proposed without a due regard to the principles of pathology which ought ever to regulate our therapeutic means. To complete the treatment—you might also use blisters or adopt any other form of exciting counter-irritation you might judge right, for the skin at this time would be in a state to bear it. I may conclude this subject by advising you to direct the friends of children who may be suffering from small-pox, to keep their eyes perfectly clean—to wash away the matter which collects at the tarsal margins very frequently with a little warm milk and water, and not allow them to be glued together by the concretion of the meibomian and other secretions. And permit me to enforce upon your attention the importance of puncturing and discharging the contents of those pustules which form at the border of the eye-lid; for you are acquainted with the many serious inconveniences produced by an irregular and uneven state of the margin of the palpebræ.

SECTION XII.—MORBILLOUS AND SCARLATINOUS OPHTHALMIA.

The affection of the conjunctiva produced by measles or scarlet fever is not generally of an important or severe nature, although it is almost always more acutely inflamed in the former than in the latter disease. Measles is a malady which often affects the mucous membranes most severely, and it is also of a catarrhal nature, and on these accounts you will not be surprised to learn that although

the affection of the eye, which almost invariably attends it, is usually of a slight nature, it sometimes assumes the purulent or puro-mucous character and leads either to the total destruction or serious impairment of vision.

Morbillous and scarlatinous ophthalmia are characterized by a trivial redness of the conjunctiva (which is greatest towards the tarsal margins), slight intolerance of light, augmented lachrymation, and increase, with some change in the meibomian secretion. These symptoms continue during the existence of the exanthematous malady, and by proper management subside as it declines; sometimes leaving behind a state of tinea and chronic ophthalmia, or calling into action a scrofulous predisposition, or producing pustule or ulcer of the cornea, or passing into the puriform or puro-mucous form of ophthalmia. You will be frequently told that the measles or scarlet fever has left the eye in a very weak state, and you will understand by this, that the disease of the eye excited by measles or scarlet fever occurred in a strumous child, and that the scrofulous predisposition being once brought into operation maintained its influence just as it would have done whatever might have been the nature of the cause which had aroused it from its latent and quiet state. You will remember that the disease in question is generally very mild and subsides with the decline of the exanthematous affection which produced it; that it is usually more severe when arising from measles than when produced by scarlet fever; that its severity will be modified by the acuteness of the eruptive fever; and that the consequences more generally resulting from its existence are chronic ophthalmia, strumous ophthalmia, and tinea.

Treatment.—Morbillous and scarlatinous ophthalmia, as they ordinarily occur, will not require any active treatment. You may direct your patient's eyes to be frequently bathed with milk and water; you may tell the nurse to anoint

the edges of the lids with some mild ointment, such as the unguentum plumbi, to correct the morbid quality of the discharge, to lessen its quantity, and to prevent the tarsal margins from becoming agglutinated; and of course you would attend to the state of the bowels, and also exclude the light either wholly or in part in accordance with the wishes and the feelings of the patient and the existing amount of inflammation.

If ulcer or pustule of the cornea arise, they must be managed in conformity with the rules previously laid down, or if the inflammation have extended or have changed its characters, then of course your treatment would vary in a corresponding manner; and the treatment of tinea or strumous ophthalmia as consequences of morbillous or scarlatinous ophthalmia would be conducted according to the usual mode of managing those diseases, from whatever cause they may have proceeded.

And here let me again caution you to clear away the meibomian secretion from the tarsal margins, for it is no longer the bland fluid of health, but it is highly irritating, and if permitted to accumulate and come in contact with the sclerotic conjunctiva will most assuredly aggravate the inflammation. Should the ophthalmia become of a mucous or a puro-mucous nature, you would substitute the alum or zinc lotion for the goulard lotion, or milk and water, and be particularly careful to apply them in a warm state.

I have now concluded my observations on those acute inflammations of the conjunctiva, commonly termed "ophthalmia," but as a class or division more correctly and precisely designated "conjunctivitis;" and shall at once proceed to speak of its chronic diseases, and afterwards, in order to complete my exposition of the pathology of this

membrane, shall consider those maladies, which cannot in strictness be said to be included under either of these divisions, although it is desirable, as a matter of convenience to the reader, so to arrange them. The compound affections mentioned by authors have been referred to in the course of my observations upon those diseases of which they are said to be compounded, but believing that diseases do not generally speaking evince a disposition to confuse their characters by blending themselves with those of a different nature, and knowing that this union of divers diseases rarely takes place in the eye (at least, so that the separate characters of each are preserved), I have omitted any special notice of these compound affections, and have not spoken of them as distinct diseases under a separate name, but have mentioned the occasional occurrence of this circumstance as will be found on referring to my remarks; thus, traumatic ophthalmia—inflammation with laceration of the conjunctiva, &c. arising from external injury—has been alluded to in the course of my observations on simple conjunctivitis and will be again mentioned in my remarks on sclerotitis, when I shall more particularly consider the degree in which *proximate* structures are affected (when some part or other of the eye is acutely inflamed) *merely in consequence of their proximity.* Why should traumatic ophthalmia be considered as a distinct disease under a separate name, merely because the inflammation and laceration arose from a blow or some accidentally applied violence, whilst its characters (the characters of the inflammation), symptoms, history, and the treatment required for its cure, differ in no essential particular from simple acute inflammation of the conjunctiva arising from any other cause? Puro-mucous ophthalmia has been considered in the course of my remarks on catarrhal ophthalmia, where I have mentioned certain variations in the qua-

lities of the discharge proceeding from the conjunctiva; and all the diseases compounded of the simple inflammatory affections of the conjunctiva have, in like manner, been adverted to; but not, I again repeat, treated of as distinct affections under a separate name, for I have not found them thus entitled to separate description, *ab origine*, although their characters sometimes become gradually blended and confounded in their progress; but if all occasional combinations of diseased action (which occur in many instances merely as modifications of some given morbid condition) were to be considered separately as distinct diseases, I can imagine nothing better calculated than such a procedure, to confuse and amplify a subject already quite sufficiently extensive and intricate.

The occurrence of ophthalmia from the retrocession of various forms of eruption is sometimes discussed as a distinct disease,* but I have preferred to allude to the occasional production of inflammation of the eye from this circumstance, when speaking of the general causes of ophthalmic inflammation. Psorophthalmia,† porriginous oph-

* This has been done by DEMOURS at that part of his *Traité des Maladies des Yeux* which treats "De l'ophthalmie par rétrocession d'éruptions," and he mentions that "M. ALIBERT a cité (*Diction. des Sciences médicales*, tome viii, p. 32.) l'observation d'une fille de quinze ans, chez laquelle une cécité complète fut occasionée par la répercussion d'une dartre pustuleuse." Tom. i. p. 209.

† *Observations on the Ophthalmy, Psorophthalmy, &c.:* by JAMES WARE, London, 1805. p. 101. "Uti nomen docet psorophthalmia proprie designat oculi inflammationem ex psora corpus occupante ortam." BENEDICT. *De morbis oculi humani inflammatoriis*, p. 203. "I shall consider that psorophthalmia which can be induced only by the matter of itch. As the itch is known not to affect the skin of the face it appears that the real psorophthalmia arises either after a sudden repression of the eruption, in which manner however it does not often occur,—or from infection of the eye-lids with the matter of itch." MONTEATH's translation of WELLER's *Manual*, vol. ii. p. 258. "The genuine psorophthalmia, as the name implies, is always induced by the poison of itch, and is either caused by the direct application of this matter to the eye-lids, or from its suppression in some other part of the body." WELBANK's Edition of FRICK, p. 234.

thalmia, &c. have also been discussed at considerable length by many writers on diseases of the eye. With respect to the first of these maladies, I quite agree with Mr. Lawrence, that neither the eye nor the eye-lids are subject to any disease which partakes of the nature of psora, (I am aware that this statement is opposed to the opinions of Callisen and Beer) and with regard to the affection of the eyes from the contact of the matter of porrigo, as mentioned by Mr. Christian and many preceding writers, I can only remark that I have seen no correspondent malady, although I have of course noticed various inflammatory states of the eye and eye-lids follow the removal of porrigo and other eruptive and morbid states of the skin, and have often in such case cured the disease of the eyes by the use of blisters and by the insertion of an issue.

CHAPTER II.

CHRONIC DISEASES AND VARIOUS AFFECTIONS OF THE CONJUNCTIVA AND OF THE SUBCONJUNCTIVAL CELLULAR MEMBRANE.

SECTION I.—CHRONIC INFLAMMATION OF THE CONJUNCTIVA.

Chronic ophthalmia may be either a second state or stage of severe conjunctivitis, or a primary disease arising quite independently of any previously existing acute inflammation of the conjunctiva. You will recognize the disease by the slightness of the pain with which it is attended, the very trifling degree of intolerance of light which accompanies it, and the particular condition or degree of vascularity which is present:—many of the conjunctival vessels will be considerably enlarged and very tortuous in their course, and will sometimes extend upon the cornea, giving rise to what is commonly termed, vascularity of that part, which it will be remembered is different in many important particulars from genuine *corneitis*. This great enlargement of the vessels of the conjunctiva renders the mucous surface uneven, and produces a feeling of smarting or scratching whenever the lids are moved at all quickly upon the surface of the eye, and in many instances you will be compelled to examine the eye and evert the lid, in order to satisfy the patient that there is no foreign particle beneath the palpebræ producing the inflammation and the uneasy sensation of which he complains.

This state of chronic ophthalmia is, as I have represented, frequently produced by a previous state of acute conjunctivitis, which has been inefficiently or unsuccessfully treated, or totally neglected, and, on this account, is most commonly noticed in the eyes of the poor, who, when they are suffering from "sore eyes," as the inflammation of those organs is termed, proceed perhaps to a druggist, or some less competent person, and obtain a simple eye-wash, or a dose of purging physic, when, in fact, they ought to be actively treated and freely depleted in order to arrest the acute disease and prevent the occurrence of the secondary and more tedious malady. The vessels of the conjunctiva, in consequence of the yielding nature of the textures in which they are situated, are very prone to admit of distension, whenever a distending cause is acting powerfully for a long period, and by reason of the softness of the textures around, they do not receive that assistance in their attempts either to resist the distending force or to recover their former size on the subsidence of that distending force, as other vessels do which are situated in firmer textures:—if therefore they are subjected for a long time to the agency of a distending force (as happens in prolonged inflammation of the conjunctiva), they are likely to lose their contractile power, and to remain permanently enlarged; on this account it is highly important that acute conjunctivitis should be met with active remedies, and that venesection should be early employed to an extent varying with the existing degree of inflammation, and repeated until that subsidence of inflammatory action and that diminution in the size of the vessels of the conjunctiva occurs, which will prevent the result to which I am now directing attention.

I cannot be expected in the course of a few brief remarks on chronic ophthalmia to enter upon the theory

of inflammation, nor to point out the various modes in which arteries recover their natural size after an attack of inflammation which has led to and maintained their distention for a longer or shorter space of time, but you must permit me again to call your attention to the facility with which the blood vessels of a part of a loose texture acquire and retain an increase of magnitude whenever the distending force is applied for a certain period, because it is from a knowledge of this fact that you will be made acquainted with the importance of preventing such an occurrence by the prompt adoption of active treatment, when inflammation which is likely to lead to this morbid condition is seated in a part possessing such anatomical qualities—that is, softness, looseness of texture, and easy distensibility. There are of course other very obvious and important reasons why your treatment of acute inflammation, particularly when situated in the coats of the eye, should be prompt and decisive, but that I have just mentioned is one of very great importance as respects the inflammation of the conjunctiva. If acute inflammation be seated in the sclerotica, and be not promptly met by the adoption of active antiphlogistic treatment carried to a sufficient extent, it may cause the patient to endure a vast deal of unnecessary pain—pain which might very easily have been avoided; but the firmness of its texture whilst it offers, on the one hand, an insurmountable obstacle to any *considerable* enlargement of its vessels, (of course I am now speaking of those vessels which are situated within the substance, and not upon the surface of the sclerotica) assists, on the other hand, those vessels to recover their original magnitude when the cause of their enlargement is no longer in active operation; but, if the same amount of inflammation exist in the loose texture of the conjunctiva, its vessels would be very likely to con-

tinue much enlarged on the subsidence of the acute inflammatory symptoms; and there may remain, as a consequence of such a state of things, either chronic ophthalmia, or a varicose enlargement of the vessels of the conjunctiva.

But to resume the description of the symptoms of chronic ophthalmia—the enlargement of the conjunctival vessels is chiefly apparent at the periphery of the globe, and also at the angles of the eye, and in the mucous lining of the lower lid; and sometimes the valvula semilunaris and lachrymal caruncle will be very red and tumid, as in the case of irritable ophthalmia. The acute and chronic state of the conjunctiva are merely to be considered as variations in degree of the same inflammation.

I have said that chronic ophthalmia frequently occurs among the poor, who (for reasons previously explained) do not generally obtain that prompt and decided treatment for the cure of acute conjunctivitis, which is necessary in order to prevent those changes in the blood vessels which may eventually lead to their permanent enlargement; but it must be remembered, that in spite of the best care and most skilful management, acute ophthalmia will, in some persons, whose constitution is weak and unhealthy, lead to the establishment of chronic disease. In such persons any loss of tonic power in any situation is with difficulty regained by the aid of all possible collateral assistance, but when instead of such assistance, there exist, as in the case in question, circumstances calculated to retard rather than aid its recovery, we can scarcely feel surprised at the frequency with which the vessels of the conjunctiva remain much enlarged in certain habits and in particular conditions of the constitution, after an attack of acute conjunctivitis. The acute symptoms may also be so exceedingly severe, that although venesection and depletion may be promptly and freely employed, they are not competent to prevent

altogether these injurious effects upon the coats of the blood vessels.

But, on the other hand, the conjunctiva may be exposed to some source of irritation which is constantly acting, and which may ultimately lead to the establishment of chronic ophthalmia. For instance, a wart or a small tumour may grow upon the tarsal margin, and excite a slight degree of ophthalmia, with a trivial enlargement of some of the conjunctival vessels, and very many times have I removed these small tumours, and without employing any lotions or applications of any kind to the eye, the patient has been perfectly cured of the ophthalmia, which has perhaps been teasing him for many months previously. You will often be consulted in similar cases, not respecting the warts or tumours, but on account of the ophthalmia they may have produced, and if you are not aware of this fact—that is, the dependance of the ophthalmia on the continuance of the wart or tumour at the edge of the eye-lid—your curative efforts will be of little or no avail. And I mention this circumstance so particularly, because, knowing the aversion which parents generally have to the employment of surgical instruments upon the persons of their children, and knowing too that they dignify every unimportant matter of this kind with the appellation of *a surgical operation*, and connect with it all the fearful ideas, and (not always imaginary) apprehensions usually attached by them to such operations, you may be reluctant to advise its removal unless convinced that it is the actual cause of the irritable state of the eye, and that that irritable state will very probably continue as long as the tumour is allowed to remain. And your examination of the part may not alone always enable you to decide this point, for, in many instances, these tumours do not appear to be capable of irritating the conjunctiva either *from their nature, the state of their*

surface, or from their situation. I have witnessed very many such instances, where the tumour was not of a malignant character, and where also when the child has been moving his lids freely, the tumour being situated at some distance from the tarsal margin, did not appear to come in contact with the globe, and was, moreover, so soft and smooth on that side towards the eye-ball that it could scarcely be expected to excite any uneasiness even if it did touch it; but if you were to act on this presumption, you would soon be compelled to change your opinion, and the result of the case would remove any doubt that might previously have existed in your mind. In almost every instance in which I have either removed such warts or tumours myself, or seen them removed by others, in these doubtful cases—that is, cases where from the character, situation, or figure of the tumour, it was matter of doubt whether it was the real cause of the existing degree of irritation of the eye—the ophthalmia has quickly subsided, unless indeed it had been permitted to remain so long prior to the performance of an operation for its extirpation, that the mere circumstance of its prolonged duration would itself constitute an adequate cause of the continuance of the inflammation. The conjunctiva may be affected with chronic ophthalmia in consequence of the irritation produced by the mal-position of one of the cilia, and simple as this cause of chronic ophthalmia may appear, and easy as its removal may seem, I can assure you that many a patient has been permitted to remain in a very unpleasant situation for years who has only been suffering from this cause. You can easily discover when entropium or trichiasis is producing irritation, or when the conjunctiva is suffering from the actual inversion of an eye-lash of an ordinary size and of the same colour as the other cilia, or where an eye-lash of this description is growing from

the inner (mucous) edge of the tarsal border, but if the eye-lashes happen to be of a black colour, to grow apparently in a very regular manner, and every thing about the palpebræ is (to superficial observation, at least,) quite correct, you might not, under these circumstances, expect to find, what sometimes may be discovered on close and attentive examination, namely, an extremely fine and delicate eye-lash, growing from the *innermost* (mucous, or as it is more precisely called, *ocular*, in opposition to its other margin which is termed, *cutaneous*) *edge* of the tarsal border, and reflected upon the under surface of the lid, nor might you judge it necessary to evert the lid in order to see if any thing connected with it would elucidate the object of your scrutiny; and yet I have known a fine hair grow even from the mucous membrane lining the lid, and give rise to and maintain all the symptoms of chronic ophthalmia. It must however be admitted that both these things are of extremely rare occurrence, but as they do sometimes take place, it is right to mention them. You will not confound that mal-position of the eye-lash arising from an improper obliquity in its direction, with those cases where the capsule of the cilium is situated at the *innermost edge* of the tarsal border, or within and beneath the mucous membrane in some other situation, (where, when the hair grows it must of necessity project against the eye-ball,) because they will generally require very different methods of cure; for, the former defect may be remedied by the frequent evulsion of the eye-lash, but the latter may require either the excision of the cavity containing the bulb, or the application of the nitrate of silver to the hair capsule after the hair has been extracted, with a view of producing its total obliteration.

It has been said that chronic ophthalmia may arise from ectropium, entropium, or trichiasis, and in such cases

the cause of the mischief will be so obvious, and the means of removing it so simple, that nothing more need be said concerning these defects, until we arrive at that part of our subject when such affections will be particularly considered, as distinct diseases.

Foreign particles may become entangled in the folds of the conjunctiva or impacted in its substance, or, having passed beneath the conjunctiva, may remain in its cellular membrane and may thus acquire a mucous covering, but, from the projection they form, and the inequality they occasion, may still constitute a source of material irritation. I need scarcely say, that in every such case the removal of the foreign particle is advisable, that is, presuming there are no peculiar circumstances in existence, rendering its removal unusually painful or very dangerous, at least, so far as the risk of penetrating the globe, or provoking serious inflammation, are concerned. These particles are sometimes not merely thrust beneath the conjunctiva, but are so firmly impacted in the sclerotica, that any persevering attempt at removing them would endanger the safety of the whole organ; if, therefore, after having commenced an operation for their removal you were to discover this fact, you would at once desist from any further efforts to dislodge it, and recommend the patient to bear with as much philosophy as possible, "the ill he has." I saw a person with a collapsed eye-ball some time ago, who told me that a piece of metal had resided in his eye very quietly for many years, and although it certainly constituted a personal blemish it did not occasion any important inconvenience, when an officious surgeon proposed its removal, and truly he did remove it, but to adopt the poor fellow's words, "as soon as the piece of metal was dug out the watery part of the eye followed," and after a long and serious indisposition the eye-

ball collapsed. Foreign particles may remain covered by the conjunctiva, and may excite little or no inconvenience, and if, in such instances, they did not constitute so important a personal blemish as to render the patient anxious for their removal, I should strongly advise you to suffer them to remain. Mr. Wardrop says that he found a piece of whinstone beneath the conjunctiva in the eye of a person after death which had been there ten years without occasioning any annoyance. I have myself many times seen patients in whom the residence of minute substances beneath the conjunctiva for many years, has not occasioned any inconvenience whatever, and until they do so, it would scarcely be judicious to attempt their removal.

The number of cases of chronic ophthalmia has been much increased by the introduction of gas into the shops of the working classes, and let me advise you to recommend all persons who employ the eyes much by this description of artificial light to adopt those means of protecting the eyes whilst using it, which have a tendency to diffuse—equally diffuse, and steady the flame; a long narrow glass ought to surround the flame, and if greater accommodations can be procured, a ground globular glass of a large size, should be placed over and around it. When I formerly witnessed the mode in which it was used, no precautions whatever were taken to prevent its *injurious* influence upon the eye, for it was allowed to burn in shops where the currents of air were constantly causing the flame to veer and fluctuate, and nothing was placed over it with a view of diffusing the light which emanated from it, so that the workmen pursued their avocations by a light of a most flickering and vivid description, which was intensely brilliant only in one spot, and many of them suffered, as may be supposed, from chronic ophthalmia and amaurosis. It also appears to me that if a large quantity of gas be burnt in a small apart-

ment, the air of that apartment acquires qualities capable of acting injuriously upon the eye, quite independently of the influence associated with the mere intensity of the flame.

There are certain employments which have a tendency to irritate and injure the conjunctiva and lay the foundation of chronic ophthalmia, but without mentioning them separately by name, I may state that they are generally such as produce an abundance of irritating dust, or require the artisan to pore over very minute objects or to look more or less intently upon a bright, a polished, or a heated surface. Chronic ophthalmia is often dependent on a feeble cachectic habit of body, and on various conditions of impaired health, or at all events if it be not *wholly* and *entirely*, it is *mainly* dependent on some disordered state of the system.

After the vessels of the conjunctiva have been permitted to continue in an enlarged state for some time, and particularly if the eye has been subject to many attacks of acute inflammation, they are seldom perfectly restored to their original dimensions, but remain much increased in size, and, on this account, the eye is rendered extremely irritable, and very likely to become severely inflamed from a slight cause, it is in fact placed in the most favourable condition to accept a renewed attack of acute inflammation. You will be surprised to witness the magnitude the vessels of the conjunctiva sometimes acquire under such circumstances, for, their tonic property being so far impaired by prolonged or excessive distention as to prevent them from properly contracting upon their contents and regaining their original dimensions, they are liable to become still further increased in volume by every fresh attack of inflammation, and to remain in or nearly in that state of enlargement in which the last inflammatory process left

them, and in this manner they go on increasing in size still being less and less capable of reacquiring (by the contractile properties belonging to such order of parts,) their natural dimensions, until they constitute what is termed *a varicose state of the vessels of the conjunctiva.* The enlarged vessels gradually extend beyond the margin of the cornea, and the conjunctiva covering that part becomes more or less extensively involved, until it remains either in a condition of permanent vascularity or of pannus.

Such are the more ordinary consequences of neglected or mismanaged chronic ophthalmia:—namely, 1,—an irritable condition of the conjunctiva with a disposition to become acutely inflamed from a very trivial cause; 2,—a varicose state of its vessels; 3,—inequality of its surface, and an extension of chronic disease to the conjunctival covering of the cornea, producing either simple vascularity of the cornea or pannus; 4,—a morbid condition of the meibomian glands, ducts and follicles—tinea.

Treatment.—Having explained the causes of chronic ophthalmia, you will readily understand by what rules its treatment is to be conducted; do not permit acute conjunctivitis occurring in a strong phlethoric subject, to leave behind a state of chronic ophthalmia for want of active depletion. If acute conjunctivitis arise in a weak delicate subject, you must be careful to subdue its more active symptoms without delay by the adoption of the ordinary means employed for that purpose, most cautiously regulated by the state of the local symptoms and the strength of the patient, and follow up this treatment by the application of leeches immediately beneath the tarsal margin of the lower lid, succeeded by some slightly stimulant or astringent application to the eye, such, for instance, as a weak solution of zinc, or of the nitrate of silver, or the common alum lotion; and do not

neglect counter-irritation to the back of the neck, behind the ears or to the temples, as circumstances may determine, and gradually increase the strength of your astringent or stimulating remedy as the case approaches towards recovery and is enabled to bear it. I need not tell you that it is right to regulate the diet; by which regulation I do not mean either to recommend one consisting of a decided stimulant or of a starving character, but that modification of either the one or the other which changing circumstances may render necessary. The bowels also will require attention, and I am in the habit of prescribing the blue pill and colocynth for adults, and the hydrargyrum cum creta with rhubarb for children, so as to keep the bowels gently relaxed, unless there exist indications for more active purgation. In those instances where chronic ophthalmia arises from the residence of a foreign particle between the folds of the conjunctiva or beneath that membrane, or from the existence of warts or tumours upon or near to the tarsal border, or from much employing the eyes by gas-light, the removal of such cause of the ophthalmia will generally be sufficient to effect a cure; but if it be not quite adequate, the same treatment will be required as for the cure of chronic ophthalmia arising from any other cause; but if it be occasioned by the irritation of fine particles which are either floating in the confined atmosphere of a workshop, or are propelled from substances upon which the artisan may be employed, you must recommend those means of protecting the eyes which are best suited to the circumstances of the case, and combine with such recommendation those remedies which present necessities may require.

Chimney-sweepers are very commonly sufferers from chronic ophthalmia, in consequence of the continual irritation to which the conjunctiva is subjected from the lodgement of soot and filth, and many such persons have the

transparency of the cornea seriously impaired at a very early age, independently of the loss of the eye-lashes from neglected tinea, and the same thing very often happens to mason's labourers, except that the changes in the cornea to which I have just alluded are more common in the latter than in the former, and are not generally confined to its conjunctival covering, owing to their greater liability to have that part affected by the caustic nature of the substances floating around them, particles of which are being continually conveyed against the surface of the eye. In such cases you can only recommend them to take an opportunity once or twice in the course of the day, of removing the dust and filth from and around the eye, and to avoid every unnecessary exposure of the organ to these sources of injury and inconvenience. When the mucous lining of the lids has a fungous or granular, a scaly or a very vascular appearance, I should advise you to apply the sulphate of copper gently upon its surface two or three times, and in the same way you would also apply it to the conjunctiva of the upper lid if required, except that it would be necessary to evert it with a probe. The scaly condition of the mucous membrane is often much relieved by the use of the scalpel, and I am in the habit of shaving away these morbid portions of the mucous membrane as well as the more prominent of the granulations, with a common scalpel, and afterwards applying to it the astringent remedies. Sometimes you will find it necessary to scarify the palpebral conjunctiva when it has a somewhat pulpy and very vascular appearance; in this way you may obtain a large quantity of blood from the immediate seat of inflammation, but if you carry this practice too far, if you either scarify very frequently or very deeply, the conjunctiva will be rendered uneven, and the eye will be continually irritated by the friction of the

cicatrized surface upon it. If a few vascular trunks only are enlarged, or if they evince a disposition to extend or do already extend upon the cornea, you may remove a portion of their entire canal in the way I formerly mentioned, that is, by means of a pair of scissors convex towards the eye-ball, taking care to include only that portion of the conjunctiva which immediately surrounds the enlarged vessel, and, with a view of preventing any injury to the sclerotica, I should advise you not to snip very deeply at first, but, having cut as deeply as you judge prudent, if the vessel be not included with the excised portion of the conjunctiva, pick it up afterwards with a double-hooked forceps, and remove it, which may always be very readily accomplished, as the first operation exposes, if it does not actually remove, that portion of the vessel you are desirous of excising.

As there is sometimes a certain degree of tinea connected with chronic ophthalmia, I should recommend you, whenever this occurs, to direct a little of the diluted nitrated ointment or the nitrico-oxyd ointment to be cautiously smeared along the tarsal borders every evening, but in those cases where although there may not be any decided tinea, the meibomian secretion is only slightly altered in its qualities and much increased in quantity, the unguentum zinci would be preferable, as being less stimulating and more astringent than the nitrated ointment. There are of course various remedies of this class which have been at one time or other highly extolled, but, instead of enumerating them separately, I shall beg to draw attention to the *principle* upon which those remedies which are most serviceable in this condition of things, appear to effect their salutary operation. The nitrated ointment is undoubtedly a powerfully stimulating application to the mucous membrane of the eye, and its value is

unequivocally proved in those cases where the meibomian secretion is rendered more glutinous, more abundant, and more viscid than usual, the tarsal borders and the neighbouring portion of the mucous membrane being at the same time in a state of chronic inflammation; the unguentum zinci is more serviceable in those cases, where there is very little inflammation but great increase of the discharge naturally produced by the part, which discharge is thinner and paler than it ought to be.

Entropium, ectropium, trichiasis, and the growth of a single hair from the inner edge of the tarsal border, may, as I before pointed out, produce chronic ophthalmia, and may require the customary operation for their removal, or the usual treatment for their relief. SCARPA recommended certain medicated poultices to be applied to the eye for the cure of chronic ophthalmia, and most of the German writers have great faith in herb fomentations; and at one time many English practitioners considered the undiluted liquor plumbi acetatis to be a pretty certainly efficacious remedy, but all these modes of treatment appear to have emanated from those exclusive views, or to have proceeded from that forgetfulness or ignorance of minute pathology, which more particularly characterized the therapeutic measures adopted in earlier times; certainly if any remedy of the stimulating kind is entitled to greater credit than another, in these cases, it is the vinum opii, applied once or twice during the day:—it will be rembered that I am now speaking of the treatment of a disease of a chronic character limited to the conjunctiva, and more particularly of that part of the treatment which has been preceded by the requisite remedies for the diminution of inflammation, but which have not been sufficient to remove it altogether or to produce the absolute contraction of the enlarged conjunctival vessels. However, I do not advise you to *commence* the

treatment even of chronic ophthalmia by the use of the vinum opii, but I am anxious to assure you that it is a most valuable remedy when applied at a proper season with a view of *completing* the cure.

Of course there are many other stimulating applications which effect the same object as the use of the vinum opii, and which are almost equally valuable, and particularly the strong nitrate of silver ointment, but I may mention that the latter application possesses no advantage over the vinum opii in these cases, and is certainly not to be preferred, because it excites more pain, and has a tendency to produce tinea and even ulceration, by lodging, either in substance or in a state of solution, upon the tarsal margins, for whatever care may be employed in using it, it cannot be applied to the whole mucous surface so completely and equally as a liquid remedy; and unquestionably, if often used, it gives rise to a tendency to entropium, and strongly disposes the vessels of the eye to become enlarged on the application of a trifling source of irritation,—if I may be allowed the expression, it places the eye in a favourable condition to accept acute inflammation. I do not by any means place the same degree of reliance on the permanence of the cure of an inflamed eye which has been accomplished chiefly by the aid of strong local stimuli, as in those cases where the same kind and degree of inflammation has been removed *secundum artem*—in a more usual, regular and *legitimate* manner—that is, by the adoption of antiphlogistic measures, the use of purgatives, the employment of cooling collyria, the application of counter-irritants, &c.

I have stated that chronic ophthalmia is sometimes induced and maintained by impaired tone of the system and by various defective states of health, and of course it would be right in all such instances to adopt the same remedial

measures for the removal of the particular state of general disorder which may be present as though it were absolutely unproductive of and unassociated with any affection of the eyes. So that in this view of the case the treatment of chronic ophthalmia (" weak eyes," as they are termed) may be said to comprehend in a more or less remote degree the management of a very numerous part of the pathological conditions to which the human body is obnoxious.

As chronic ophthalmia is sometimes induced by much employing the eyes too soon after the removal of acute ophthalmia, it is desirable to recommend the greatest caution to be practised in the mode of using these organs, until the hazard of re-producing inflammatory symptoms by such means, has ceased to exist.

SECTION II.—GRANULAR CONJUNCTIVA.

The mucous lining of the lids is said to be granular when its surface is irregular and uneven, whether this irregularity consist in a thickened, vascular state, accompanied with minute projections, or in the production of a few more considerable prominences with or without much increase of general vascularity. The conditions of the conjunctiva included under the term, *granular*, are indeed of a very varied character;—if it be slightly thickened and its smoothness a little impaired; if it be generally rough and uneven without any particular enlargement and any especial prominence in one situation more than another; or if fungous projections and vascular productions of considerable size proceed from its surface; or if the mucous membrane be simply in a scaly state, still the same name obtains, and each of these pathological conditions is comprehended under it *(the granulated state of the conjunctiva)*.

Having briefly defined the disease in order that you may the more clearly understand that the term is applied to a variety of morbid actions leading to the substitution of a rough and more or less uneven surface for one of a delicately smooth and beautifully soft and even character, I shall proceed to mention those symptoms which are produced by this condition of the lids, when the disease has proceeded so far as to occasion inconvenience in an eye which has not yet undergone any of those changes which sometimes precede but which are more commonly produced by this morbid condition of the mucous lining of the palpebræ.

In the first place it will be rendered irritable by the friction of a rough surface upon the cornea, and this will lead to a slight degree of intolerance of light, epiphora, and an uneasiness which scarcely amounts to pain, and will cause the lids to be more frequently closed than usual, not simply from any morbid irritability its muscles may have acquired, but—in obedience to a law with which they are familiar,—with a view of closing the lids and diffusing the tears, just in the same way as an irritable state of the eye from whatever cause produced gives rise to the same occurrence; for, whenever epiphora exists,* the lids close to distribute the increased quantity of the lachrymal secretion as equally as possible over every part

* The existence of epiphora in these cases is owing partly to an increased secretion of tears and partly to the diseased state of the tarsal margins and a slight change in the position of the lachrymal puncta. Whenever the surface of the conjunctiva is rendered uneven, whether by the enlargement of some of its vessels, by the presence of granulations, &c., increased lachrymation takes place, just as though a foreign body were present and were producing the same result. Inequality of the surface of the conjunctiva is frequently attended by a state of irritation at the tarsal borders, which diminishes the size of the lachrymal puncta by swelling and inflaming their margin; and it has also a tendency to prevent the accurate adaptation of the edge of the palpebræ to the surface of the eye-ball, so necessary to the free transmission of the lachrymal fluid towards the puncta.

of the front surface of the eye, and to form, by the junction of their tarsal margins, that channel or groove which inclines the tears towards the lachrymal puncta, and thus to assist them in conveying away a larger quantity of the lachrymal fluid than they would otherwise be disposed to absorb. And you will at once perceive the object and the necessity of these occurrences; for, if the lids did not close more frequently than usual, the tears would not be scattered equally over the surface of the eye, but would remain supported upon the tarsal border of the lower lid, until, from their abundant accumulation, they streamed down the face—this state of things would, of course, much confuse vision.

When speaking in general terms of the symptoms *produced by* a granular state of the conjunctiva, you would say that, as respects the globe of the eye, there are none peculiar to it—they are in fact such as accompany an irritable state of that organ, from whatever cause excited. But this irritability may, in some cases, be very considerable, and in other instances extremely slight; or, an accidental inflammation may supervene—an inflammation superadded to existing symptoms—which will have its own characters and produce its own effects, and will require the same amount and description of antiphlogistic remedies as inflammation arising independently of the pre-existence of any other morbid affection. However, this acute state of inflammation is not to be taken into account when speaking of the granulated state of the conjunctiva in the general, for although it is sometimes undoubtedly produced by it, and occasionally supervenes upon its existence, just as any other acute disease may supervene upon a chronic affection, the occurrence is extremely rare and has no necessary connexion with the malady under consideration. You would not expect the

symptoms to be equally severe when arising from some of the various states of the palpebral conjunctiva to which I have just adverted, as when proceeding from others to which I have also referred; inasmuch as in the one case the conjunctiva may be scarcely at all altered in structure, whereas, in other instances, it has probably undergone very considerable changes. As then the conjunctiva may be slightly rough and thickened; pulpy and vascular; merely scabrous; or affected with more considerable fungous or vascular productions; so will the symptoms depending on the morbid state of the conjunctiva vary in extent and severity.

There is one other symptom to which it is right to advert, I mean that uneasy sensation as though sand or particles of dust were beneath the lids, which is invariably present when the equality of the sclerotic or palpebral conjunctiva has been much impaired, and this sensation, which will be experienced at every movement of the lids upon the surface of the eye-ball, will vary in degree from a mere itching or smarting to an acutely painful scratching sensation, as the structure of the mucous membrane may have sustained merely a slight or a more important alteration; and as the morbid change may have occurred near to or more remote from the tarsal margin.

As the changes in the conjunctiva vary in their external characters, you would naturally expect that a minute examination of the changed structure would unfold the source of this variation; and you would be wrong in ascribing changes so very different to one and the same source—undoubtedly it would be wrong to restrict the production of these various changes to any one cause. Mr. Lawrence contends that the granular conjunctiva is simply the result of inflammation, which has first led to the deposition of new matter, and afterwards by thickening the conjunctiva and

causing it to acquire adhesions to this lymphatic deposition in the subconjunctival cellular membrane, has changed the smooth mucous surface into one of an irregular, scabrous, or granular character. Mr. Mackenzie, on the other hand, maintains that these vascular productions are simply the acini of the meibomian glands in a state of enlargement, and he has arrived at this conclusion, not merely from an attentive examination of dried portions of granular conjunctiva, but also from their situation, for he has always observed the granulations to be most abundant in the upper lid, and at that part of it nearest the tarsal border, where these follicles are naturally most numerous. I agree with Mr. Mackenzie that the granulations are most numerous, or at least apparently most numerous, in those parts of the conjunctiva which cover the tarsal cartilages, and that they are especially abundant in the upper lid, the tarsal cartilage of which is much larger than that of the lower palpebra; but it must be remembered that the vessels of the conjunctiva cannot, when distended by inflammation in this situation, relieve themselves by those effusions into the subjacent cellular tissue, which take place so freely when the inflammation occurs in other parts of the conjunctiva, at least not by any means to the same extent, and that consequently almost all the effects of severe or long continued inflammation are expended on its ocular or external surface,—upon that part of its surface which is most distant from the tarsal cartilage; but not only is that portion of the conjunctiva lining the tarsal cartilages liable to undergo changes of texture from a degree or extent of inflammation, which would either not produce them at all, or only produce them in a much more limited degree if situated in those parts of the conjunctiva which are connected posteriorly with a quantity of loose cellular membrane, but any inequalities upon its surface are rendered more

apparent when so circumstanced; for, an unevenness of surface which might not be distinguished when permitted to lie loosely upon a mass of cellular tissue would immediately become evident when tightly stretched upon the smooth, plane, and comparatively unyielding surface of a piece of cartilage. It will be understood that I am not stating that the granular state of the conjunctiva is not sometimes solely, and in many instances partially produced by the enlarged acini of the meibomian follicles, nor denying that the evidence adduced by Mr. Mackenzie establishes these facts, but am merely pointing out the other causes which, in my opinion, are in some cases adequate, *per se*, to its production (but more commonly they merely contribute to this end), and am further directing attention to those circumstances, which offer an explanation of the occurrence of a greater number of granulations upon that part of the conjunctiva which covers the tarsal cartilages, without *invariably* referring their origin to the enlargement of the acini of the meibomian follicles.* The

* The reviewer of various works on diseases of the eye, in the *Quarterly Journal of Foreign Medicine and Surgery*, (for the year 1819) who is evidently a person of extensive information, takes it for granted that granular conjunctiva *always* consists of an enlarged and indurated state of the cryptæ of the conjunctiva. The enlargement of the cryptæ of the conjunctiva is, in fact, but one of a series of morbid conditions which constitute what is usually termed *granular conjunctiva*. I have sometimes found this irregular and tubercular condition of the conjunctive membrane most considerable at that part where it becomes reflected from the globe to the palpebræ, but this is not by any means a common occurrence. The following interesting remarks upon the granulated state of the conjunctiva are contained in a valuable "Report of cases treated at the Ophthalmic Hospital, Chatham," by Dr. Smith, published in the seventeenth volume of the *Edinburgh Medical and Surgical Journal*. "Upon everting the lids and examining their inner surfaces, the upper always, and not unfrequently the lower, were found more or less thickly covered with small round bodies resembling granulations or warts, which, in part of the cases, were of a fleshy appearance and consistence; in others, of a hard pale cartilaginous description; and in a third class they were of a soft texture, and dark colour, like clots of coagulated blood, and discharged

exclusive view relative to granular conjunctiva, adopted by Mr. Mackenzie, appears to be unsupported by any approach to conclusive evidence.

There are, undoubtedly, other states usually included under the term, *granular conjunctiva*, besides that I have just mentioned—the conjunctiva may be more or less generally affected, but the palpebral portion and particularly that part of it which covers the tarsal cartilages may be vascular, thickened, and slightly uneven, and this condition of conjunctiva may produce ectropium or be associated with entropium. This soft vascular structure has been compared, as respects its appearance, to the pile of fine

that fluid copiously upon being slightly touched; even in some instances the motion of the lids alone caused considerable hemorrhage.

In a part of the patients, the granulations were dispersed generally over the whole of the inner surface of the lids, whilst in others they appeared confined principally to particular parts of them, such as the *extremities*, inner edges of the *tarsi*, &c. situations where, under any circumstances, they were always most luxuriant and from which they were invariably most difficult to remove. The first variety, or those which had the appearances of granulations seen on the surface of healthy sores, most readily yielded to treatment; that is to say, they were soonest entirely removed, and a cure effected. The second, or those of the cartilaginous description, were with much difficulty acted upon; indeed they seldom underwent any considerable decrease, till after numerous sharp applications of some one or other of the escharotics, to be afterwards mentioned; and the third class, or those which resembled coagulated blood, though readily destroyed, would often, in spite of every application, attain their original size in the course of *twenty-four* hours; which disposition to sudden regeneration rendered them occasionally the most difficult of the three species to treat successfully."

Banister was well acquainted with certain variations in that condition of disease now termed *granular conjunctiva* He says, "*trachoma*, is an inequalitie and roughnesse of both the eye-liddes in their inward part, with an hard ruggednesse, as if the seedes of millet were in them. If the maladie grow farther, and there appeare clefts and rents, and little parts standing forth, not vnlike figges, it is called *sicosis*. And when the disease is waxen olde and hardened, the eye-lidde becommeth as hard as brawne, which is called *tilosis*. These varieties of the disease are still more accurately defined by the learned Sauvages. "*Trachoma* est asperitudo palpebræ in parte interna. *Dasymma* vocatur, si sit herpetica; *tylosis*, si callosa; *sycosis*, demum, si pustulæ crassiores fuerint." *Nosologia Methodica*. Tom. ii. p. 60.

scarlet velvet; it does not occasion much inconvenience, and is not generally connected with, or rather productive of, much inflammation of the eye itself.

Second change.—The conjunctiva may become rough, and scabrous, and slightly uneven, its surface may be scaly and not raised into those distinct and vascular productions which we shall presently notice; and such a state of the conjunctiva excites great irritation and is often attended with a troublesome degree of ophthalmia.

Third change.—This change consists in the development of distinct and more or less prominent and vascular growths, and may, in strict propriety, be termed the fungous state of the conjunctiva. This membrane is, in such cases, very vascular, and the growths to which I allude sometimes consist of a structure just firm enough to permit the formation and sustain the development of minute vessels. These vascular fungous projections are of various forms, but are generally of a convex figure externally; they are very soft and bleed freely when lacerated, which is very easily effected in consequence of the delicacy and softness of their structure. I have said that they vary greatly in their size, their number, and also in their form; sometimes they are as large as the half of a small pea, but more generally their size is rather less than the head of a common pin; sometimes they are very abundant, and in other instances they are few in number; and as regards their form, I have already stated that they are convex externally, and they may be suspended as enlarged vascular productions from the surface of the conjunctiva. They are for the most part soft at their origin, and so vascular that they will bleed pretty copiously from the slightest laceration, but after they have existed for some time, they usually acquire solidity and firmness, and are then correctly termed, hard granular bodies.

Fourth change.—The conjunctiva may be merely thickened and rendered slightly uneven from simple inflammation, or rather from deposition the result of inflammatory action; and the irregularity of surface such deposition will have a tendency to produce, will vary in degree according to its amount and its seat. If lymphatic deposition occur within or upon the conjunctiva it will of course tend to the elevation of those parts of it, within or upon which, it may be situated; if, in the subconjunctival cellular membrane in one or more distinct patches in particular cellules, it will elevate the conjunctiva at a corresponding number of points, or the conjunctiva may acquire adhesions posteriorly in certain situations, giving to the mucous membrane an irregular and puckered aspect.

After having become acquainted with this catalogue of changes in the structure of the conjunctiva, you may perhaps feel inclined to inquire what is the mode of distinguishing by their visible characters, those granulations (I use this term, although perhaps it be not strictly correct, in all these instances, because we are familiar with its import) which consist of some new production the consequence of inflammation and other causes, and those, which are admitted to be nothing more than an enlargement of the acini of the meibomian follicles? Although I have endeavoured and have been most anxious to supply some exact and satisfactory information upon this point, I am only prepared to state my conviction that in the latter case, they (the granulations or enlarged productions) are more uniform in size and appearance, more definite in figure, more firm in texture, and less vascular as respects the membrane which covers them, than those granulations which proceed from inflammation or some change wrought in the texture of the conjunctiva by inflammatory action. For the establishment of the accuracy of this statement, I could merely

bring forward evidence which has not been sufficient to satisfy my own mind upon the subject, and I have therefore only presented to your notice the inferences deduced from my observations and investigations.

I shall now explain more in detail than I have hitherto done, the ordinary causes of the granular conjunctiva. It has been already stated that the granular conjunctiva is often a consequence of some other disease, but in some few cases it does not seem improbable that it may arise from the enlargement of the mucous cryptæ, in other instances it is clearly referable to the existence of previous disease of an inflammatory character, and particularly to purulent or puro-mucous ophthalmia; for example, the Egyptian or acute purulent ophthalmia was frequently followed by this condition of the conjunctiva, and in many instances destroyed vision, which had been preserved from the immediate effects of the acute inflammation, by inducing chronic disease. You may often also trace its origin to an attack of neglected purulent ophthalmia occurring in infancy. It may however be produced by any description of conjunctival inflammation, if it be permitted to remain for any great length of time, and also by those primitive diseases of the conjunctiva itself which affect it in common with other mucous structures, and which are still more likely to occur in this situation from its greater exposure to the influence of external agents.

As the granular state of the conjunctiva is frequently consequent on other disease, so it also leads to the establishment of disease in other textures, and the morbid changes it has a tendency to produce are chiefly wrought upon the cornea, and may consist either in the prolongation of vessels within its conjunctival covering, or of opacity combined with thickening and vascularity of that part; but if the granular state of the conjunctiva be very

considerable, or if it has continued for a long period, the proper structure of the cornea may become inflamed, opaque, or ulcerated. An early effect of inflammation upon the cornea is to diminish its transparency, and, in this way, the cornea (its conjunctival covering, for the inflammation does not generally extend to its lamellar texture) is rendered more or less opaque when the conjunctiva is granular;—the opaque condition of the cornea consequent on the granular state of the conjunctiva is a result of the inflammation excited by the coarse friction to which its surface is subjected. Inflammation of the cornea terminates in various ways in accordance with the nature of the cause producing it, its degree of severity, and the part in which it commences, and also the extent to which it may proceed; thus, if the inflammation be very slow in its course, we have a gradually obscuring opacity produced until the whole structure of the cornea assumes first a bluish-white and afterwards a pearly aspect; if the inflammation be seated in, and confined to, its conjunctival layer, that part will become thickened, opaque and vascular, until vision is almost destroyed by the existence of that condition of disease, termed *pannus*. But, I will not enter on the present occasion upon a minute inquiry respecting these changes in the cornea, but merely mention them by name;—the changes in the conjunctival covering of the cornea occurring in connexion with or produced by granular conjunctiva may be, mere vascularity, or thickening, vascularity, and opacity combined; the changes in the cornea itself are, opacity, ulceration and staphyloma. Entropium is also another important and by no means infrequent consequence of the granular conjunctiva.

You will not always be consulted in these cases before some of these changes in the cornea have occurred, but if you are so early consulted, then it is presumed you will

prevent their occurrence altogether, or at least to any important extent. Aware of the delicate smoothness of the surface presented by the natural conjunctiva, and the admirable manner in which the ocular and palpebral mucous surfaces are adapted to, and glide upon, each other, you will not be surprised at the irritation and mischief produced by the friction of an indurated and irregular substance upon so perfectly smooth and highly polished a surface as that of the cornea.

I have said that the granular state of the conjunctiva* may be combined with various other conditions of disease and with many changes in the texture of the cornea, and I

* Minute abscesses in large numbers sometimes form in the subconjunctival cellular membrane, and they are observed to project the conjunctiva as a series of small convex white points. I have seen the mucous lining of the eye-lid completely covered with them, and yet there has been present scarcely any pain, and by the use of a little zinc or some slightly stimulating lotion, they have all disappeared without leading to any breach of surface or any injurious effect whatever. The disease is by no means important, and it is on this account, I apprehend, that it is not mentioned by writers on ophthalmology. I have sometimes observed that the texture of the conjunctiva becomes slightly raised into horizontal ridges, as though a line or several lines of that membrane had become detached from its infrajacent connexions and the sides of the detached portions had afterwards united. In this way the tarsal margin has become inverted by the shortening of the mucous lining of the lid, and a severe form of entropium has occurred. The effect of this pathological condition of parts in causing entropium is in fact similar to that occasioned by simple corrugation of the conjunctiva, for in both instances the breadth of the palpebral conjunctiva is virtually diminished, and in order to render the external and internal surface of the eye-lid due antagonists to each other as respects the maintenance of the proper position of the precise edge of the tarsus, it is frequently necessary to remove not merely its morbidly incurved margin, but also to excise a portion of the palpebral integument. It is evident, that if a membrane, having in a great measure lost its elasticity, and having attachment to moveable parts, cover a given extent of an even surface, its points of attachment must be brought nearer together, (or at least its more moveable point of attachment must be approximated to its most fixed point), if the membrane itself be either greatly elevated by the introduction of new matter beneath it, or much depressed by forming numerous attachments at different points, to infrajacent textures.

have also explained in what those changes consist, and I have now to describe the order of their occurrence. In the first place we notice the disease which precedes and disposes to those changes in the conjunctiva, which lead to, what, in the second place, may be termed, the establishment of the granular surface; and thirdly, those changes upon the cornea to which we have so recently alluded as constituting the consequences of the granular conjunctiva. Such is the order in which this series of changes takes place, and which you will notice in every case you may see at a sufficiently early period, if you are so unfortunate in the selection of your remedies as to be unable to prevent their occurrence.

Treatment.—I will not stop to enumerate the various remedies which at different times and by different writers have been advised for the cure of the granulated state of the conjunctiva. We are not now in the habit of recommending individual remedies for the cure of disease in the vague and indefinite manner which was formerly too often adopted, as though prescribing for a name which always comprehended a certain number of symptoms of a precisely similar nature and degree. Certainly our treatment must be modified by circumstances—it must be adapted to the circumstances connected with individual cases.

You will first ascertain if any inflammatory symptoms are present, and if any such exist to any important extent, you will employ the ordinary antiphlogistic measures, regulated by the customary rules, for their subduction; and this will be the first object of attention, and it is needless for me to say that general bleeding will not often be required—leeches, purging medicine, and cooling lotions, being generally sufficient for the purpose. Having diminished or removed the inflammatory symptoms, you are next to attend to the condition of the conjunctival surface,

and the state of the cornea. If the conjunctiva, in addition to its granulated state, be engaged in the secretion of a purulent or a muco-purulent fluid, which it has been accustomed to secrete in large quantities for some time previously, astringent or slightly stimulating applications will be necessary, such, for instance, as the alum wash, or the zinc lotion, or a weak solution of the nitrate of silver, or the sulphate of copper, and the good effect of your lotions will be much promoted by the administration of a little purgative medicine, by the application of a blister to the back of the neck, or by having recourse to some other mode of producing counter-irritation. Presuming that you have succeeded in removing this puriform secretion, (if any existed) and that you have also subdued all inflammatory excitement, there will be nothing but the granular condition of the conjunctiva requiring your attention, unless indeed there be any change wrought in the texture of the cornea. I shall arrange the treatment of the granular state of the conjunctiva under two heads, namely, those cases requiring excision, and those in which the morbid state of the conjunctiva is most advantageously removed by other means.

There are three states of the granular conjunctiva which appear to be more quickly and successfully managed with the lancet or scalpel than by any other hitherto ascertained means; the first is that in which the conjunctiva is scaly or scabrous; the second, where the granulations are so firm as to resist the influence of stimulants, astringents, and even escharotics, unless applied with more perseverance than in my opinion is advisable; the third state is that in which granulations, possessing a very slender neck, or of an unusually large size, are present. With regard to the best mode of performing the operation, I may tell you that nothing can be more simple; you place the flat sur-

face of a lancet upon the conjunctiva at the base of the projection or projections you wish to remove, and carry it onwards so as to excise the prominence, and render the part upon which it was situated on a level with the surrounding portion of the conjunctiva; in this way you neither permit a prominence to remain nor produce an excavation, and I may mention that this mode of operating is applicable to all cases in which excision becomes necessary; the rule for your guidance being, merely to remove every *projection* without leaving behind any *inequality of surface*.* If the granulations be seated in the lower lid, you draw it downwards and outwards so as to expose as much of the conjunctiva as possible, but if, in the upper lid, it would be desirable to evert it upon a probe, and in

* The granulations may be shaven off with a scalpel, or the shoulder of a lancet, and the abraded surface touched with a strong solution of the nitrate of silver: or, without any previous excision, the caustic may be applied, and repeated after each sloughing of the eschar, until the granulations have disappeared, care being taken, after each of these applications, to wipe the part with a sponge, and to drop into the eye some oil of sweet almonds. In this way the immediate removal of the granulations is accomplished; but their recurrence is best prevented, and the tone of the parts restored, by the use of the sulphate of copper, which is to be rubbed every second or third day against the inner side of the granular palpebræ, until an eschar is produced." Lyall in *Transactions of the Association of the Fellows, &c.* Vol. v. "The eye-lid to be operated on, is to be everted as completely as possible, a small and very sharp lancet-shape knife is to be laid flat at the root of this layer of indurated conjunctiva, which is then to be pared off by a steady motion of the instrument onwards, sawing as little as possible. In performing this operation, which is generally attended by very considerable pain, it is necessary to beware of removing more than the mere layer of indurated conjunctiva. If more than this is taken away, hard and irregular cicatrices are left on the internal surface of the lids, the effects of which, on the corneæ, are scarcely, if at all, less prejudicial than those of the disease which has been removed." Mackenzie's *Treatise*. p. 500. "The lid should be everted, and the projecting granules shaved off from the surface and orbitar edges of the tarsus, with a keen-edged lancet, or, if peduncular and prominent, they will be more conveniently snipped off with the flat scissars. In doing this, care should be taken to avoid injuring the continuous membrane." Travers's *Synopsis*. p. 277.

order to prevent their reproduction you may touch the bleeding surface, which remains immediately after the granulations have been excised, with the sulphate of copper, taking care to limit its application to the bleeding surface you have just produced,* and, before you permit it to come in contact with the globe, you may wash it with a little warm water by means of a fine syringe, and afterwards smear upon its surface a little sweet oil with a view of preventing that irritation which the caustic would be very likely to produce if permitted to touch the healthy part of the conjunctiva. I do not mean to tell you that the excision of these prominences by the lancet is the only mode of removing them, for undoubtedly they may, in nearly every instance, be taken away by other means; but if you employ those other means, in a sufficiently concentrated form for the period necessary to the completion of the cure, the transparent cornea will be likely to be seriously injured, and the eye will very probably be acutely inflamed. You may remove them with the lancet at once, without

* I have recommended the application of the caustic to the surface left after the excision of the granulations, as a means of preventing their reproduction, which is stated to occur so frequently after the performance of this operation (Lyall, Lawrence, Vetch, Travers) when this precaution has been neglected. I do not believe that the removal of the granulations by means of a scalpel, is at all likely to give an impulse to the reproductive powers of the part—to render their regeneration certain and rapid, as has been represented; on the contrary, I am persuaded that when properly excised, if the part from which they are removed be touched with the sulphate of copper, or the nitrate of silver, no reproduction of the granulations is likely to occur, or at least not to any material extent. But, it must be remembered, that neither the blue stone, nor the lunar caustic, should be used with the intention of obtaining their escharotic qualities—with the intention of producing a slough—but simply for the purpose of lessening the vascularity of the surface to which it is applied, by their tonic and astringent qualities. I consider it to be most important that the precise character of the object to be accomplished by the application of the sulphate of copper and the nitrate of silver, should be clearly defined, and that the specific extent of effect it is wished to produce, should be well understood.

producing much pain or exciting any subsequent mischief —any mischief which is properly referable to the operation itself; but, on the contrary, if you employ escharotics, such as the potassa fusa (as advised long since by WISEMAN) or the nitrate of silver, the pain is severe, and must be frequently endured, as the repetition of the application may be more or less frequently required, and the cornea and the other parts of the eye are more likely to be injured than in the former mode of cure, and besides, the time occupied in effecting the cure is much more considerable; and finally, with regard to any disease of the eye or its appendages, the continuance of which is so seriously detrimental as that of the granular conjunctiva, the advantages of a prompt cure, as opposed to one of a more tedious character, are sufficiently obvious.*

* The method of removing these granulations of the conjunctiva now suggested, was advised by READ in the year 1706. He says, "if they (the granulations) be thick and gross, they must be cut away dextrously with the point of a launcet and afterwards let the place be touched with a little fine salt, alum, or copperas-water." [I have given this quotation on the authority of a reviewer in the first volume of the *Quarterly Journal of Foreign Medicine and Surgery*, not being able to obtain the original work of SIR WILLIAM READ.] The same advice, in nearly the same words, is given by BANISTER in his *Treatise of one hundred and thirteene diseases of the Eyes*, published in the year 1622. SIR WILLIAM ADAMS removed the large granulations of the conjunctiva, with a sharp scalpel, and claimed credit for the *discovery*. The writer of an Article in the seventeenth volume of the *Edinburgh Medical and Surgical Journal*, distinguished by cutting sarcasm and vigorous argument, places the claims and merits of SIR WILLIAM ADAMS in their true light, and very properly acquits him of communicating any new and useful information respecting the treatment of granular conjunctiva. The following statement contained in DR. VETCH'S *Letter to the Right Hon.* LORD VISCOUNT PALMERSTON *on the subject of the Ophthalmic Institution for the Cure of Chelsea pensioners*, embodies a similar opinion. "It is no longer a question," says Dr. Vetch, "that SIR WILLIAM ADAMS was taught the knowledge of this stage of the disease, (the granular conjunctiva) and its treatment by excision, by the late MR. SAUNDERS, in return for instruction so liberally given on this and other occasions, he sought, by substituting a knife in place of the scissors used by MR. SAUNDERS, to appropriate to himself the whole merit of the discovery." (p. 5.)

In some cases the affection may be so slight—the granulations so minute—that you may only think it necessary to scarify the conjunctiva, and I may observe that if this treatment do not entirely rectify the morbid state of the conjunctiva it will often so much improve it, that the use of the sulphate of copper, or of the alum or zinc lotion, will be sufficient to complete the cure. But there are many cases capable of being relieved or cured by astringent or stimulant applications. The astringent and slightly stimulating applications are chiefly useful with a view of removing that gleety or puriform discharge which is sometimes connected with a granulated state of the conjunctiva, and also to diminish the volume and indurate or rather, render more compact, the texture of the conjunctiva, after scarifications have been premised, when that membrane is very vascular and much thickened as well as granular, and they may be used in the following order: *first*, the alum wash, containing about two grains of the alum to an ounce of water; *secondly*, the nitrate of silver, in the proportion of four grains to the ounce of distilled water; and *thirdly*, the undiluted liquor plumbi acetatis. The more active stimulating applications are useful in the cases which are intermediate between those states we have just described as being best adapted to the astringent remedies and those requiring excision. Among the remedies of this class most generally employed are the zinc lotion, the solution of the nitrate of silver and sulphate of copper, and the vinum opii. Any one of these may be dropped into the eye from a quill, a director, or a glass capillary tube, two or three times a day as the case may require, provided that depletion, if necessary, to a sufficient extent to subdue any active inflammatory symptoms, has been premised. If you consider more powerful stimulants requisite, the solid sulphate

of copper or the nitrate of silver are among the best,* and I have already pointed out the precautions necessary to be observed in the mode of using them.

I have as yet only spoken of one part of the treatment of these cases, and I have mentioned this local part of the treatment so particularly, because it is first in importance, for I am persuaded that you can more frequently dispense with constitutional than local remedies in the management of this disease; however, as it is not advisable to neglect either the one or the other, I shall proceed to discuss what may be termed, the constitutional treatment of the granulated state of the conjunctiva. In the first place, you should ascertain the nature of any constitutional defect which may happen to be present, whether it be a disturbed feverish state of the system generally, or a particularly disordered and deranged state of the alimentary canal, &c. Aperients combined with tonics will often be found useful, and in some in-

* Dr. Smith, in the *Report* to which I have referred in a preceding page, has endeavoured to point out the comparative advantages of various escharotic substances, and to adapt them to the different pathological states of the mucous membrane of the eye. But he does not forget to mention at the outset of his remarks that "no certain or fixed rules could be observed with respect to their use, (the nitrate of silver, the sulphate of copper, the nitric acid diluted with four-parts of water), for one of them was found to agree with one individual, which has just the reverse effect on another, where, upon the most minute examination, nothing but the strictest similarity of morbid appearances and constitution appeared to exist." "The nitrate of silver was found to be most useful in cases where the granulations were either partial, or thinly scattered over the whole surface of the lid, as to them, it could be applied with more ease and certainty, than either the blue stone or the diluted acid. The sulphate of copper was found best adapted for the destruction of those red fleshy granulations, upon which there was just sufficient moisture to effect the solution necessary to ensure the full extent of its escharotic qualities. The nitric acid was generally applied diluted with four parts of water, by means of a camel-hair pencil, and was found particularly well adapted for the destruction of the soft spongy granulations, as it possessed not only an escharotic, but also an astringent effect; and by being applied in a state of perfect fluidity, it got better into contact with them than either of the others."

stances I have prescribed the compound decoction of sarsaparilla, with an occasional dose of blue pill and the compound extract of colocynth. With medicinal means, such as these, it would of course be advisable to regulate the diet. At the same time it would be right to place a small seton in the temple, or, if it be preferred by the patient, at the back of the neck, and to recommend the avoidance, as much as possible, of every source of irritation or annoyance to the eye, such as walking much in the dust, or when the sun is shining brightly, reading by candle-light, and in short, every great or painful effort on the part of the eye. I know of no local disease which is injured by soothing and tranquillizing the constitution, and improving the state of the general health, and, if such measures are not alone sufficient to effect a cure in the disease under consideration, they will at least render your local treatment more likely to be successful; at all events I should not recommend you to employ excision or to use the more powerful stimulants, or adopt any such severe measures until you have made trial of the milder local remedies, combined with some plan of constitutional treatment.

If tinea be present (and I should have remarked that the meibomian glands are not unfrequently affected) the citrine ointment may be rubbed upon the tarsal borders in the evening, or, if some milder application be necessary, the unguentum plumbi may be used instead.

I have mentioned the advantages of scarifications, but have not perhaps dwelt upon that surgical remedy, with the attention its importance demands. When the conjunctiva is very tumid and vascular, its surface being pretty generally covered with small granulations, frequent scarifications will be of singular service, and in many other states of the conjunctiva which fall within the accepted definition of the *granular conjunctiva*, they will

materially assist our other curative means by lessening that vascular plenitude and turgescence which are alone sufficient to maintain the disease by retarding the circulation and consequently preserving the part in a swollen and turgid state.

In concluding this part of my subject, I may mention that I have not alluded to the nitrate of silver ointment as an application sometimes employed for the cure of this morbid state of the conjunctiva, because I do not consider it to be at all adapted to its removal. It may be required when the cornea has undergone certain changes in consequence of the irritation produced by the friction of the granular conjunctiva upon its surface, and I have already pointed out this circumstance in an *Article* published in the *Midland Reporter*, and shall have occasion to refer to this subject more particularly when I speak of the morbid affections of the cornea.

In those instances where you have reason to believe that the granular conjunctiva is mainly dependant on follicular enlargement and obstruction, you will understand me to say that the use of slightly stimulating lotions, such as, the much diluted liquor ammoniæ acetatis, and the common zinc wash, are peculiarly serviceable.

SECTION III.—CUTICULAR CONJUNCTIVA.

The conjunctiva sometimes becomes cuticular, it loses its soft mucous texture and acquires many of the apparent qualities of delicate skin. When carefully examined it is found to be dry, and smooth, and white, it has not the grooved and slightly sulcated appearance of common skin, but is much more delicate and smooth. The inconveniences it produces are not generally very important unless

this change in the conjunctiva be of considerable extent—it is then rather irritating to the eye-ball, and occasions moreover a sensation of dryness, in consequence of the absence of a certain part of the natural secreting surface—for, if this new structure possesses in any degree a secreting property, it does not possess it by any means to so great an extent as did the mucous membrane it superseded. The mere mention of the anatomical qualities of this new structure when contrasted with those of the granular conjunctiva will at once be sufficient to account for the little irritation it excites. It is often produced by local injury which has partially destroyed the conjunctiva, but it also sometimes follows acute inflammation of the conjunctiva, and would appear to be in some instances an organized deposition upon the surface of the conjunctiva, but more commonly the mode of repairing the loss of texture or injury that part may have sustained by the continuance of inflammation; and its smoothness is no doubt owing to the friction of the eye-lid upon it before it has acquired sufficient firmness to resist its pressure.

Nothing with which I am acquainted appears to relieve this morbid and changed state of the conjunctiva; the defect it constitutes is permanent, and if the cutaneous part be removed its place is not supplied by mucous membrane —membrane similar to that composing its original texture.

I have several times noticed a dry shrivelled state of the conjunctiva in the eyes of persons who have lost their vision in infancy from an opaque and vascular state of the cornea consequent on purulent ophthalmia. The conjunctiva of the globe, in these instances, has been raised and detached from the parts beneath, it has been quite dry, as completely so as though it had been dried by artificial means, and it was of a yellow or a dirty yellowish-brown colour. The lachrymal secretion took place as usual, but

it flowed over the morbid conjunctiva without dwelling upon its surface, and when it had collected in sufficient quantity it did not pass down the lachrymal puncta, but dropped from the inferior tarsal margin.

SECTION IV.—PTERYGIUM.*

Pterygium is a morbid growth or deposition, of a triangular figure, generally commencing at the inner canthus of the eye, at that part of the conjunctiva immediately around the semilunar fold and lachrymal caruncle, its point or smaller extremity being situated towards or upon the cornea, and its base directed towards the periphery of the eye-ball.

I have stated that pterygium most commonly arises from

* Our knowledge of this disease has been a good deal obscured, and our notions of its characters much confused, owing to the many and very different names by which it has been designated. I shall therefore beg the reader in perusing this *Section* to connect with the term *pterygium* my own definition of this malady, and the pathological conditions included under it, which, by great labour and attentive observation, I have collected and arranged, and described with the more care and minuteness because I have not observed that the progress of pterygium has been attentively traced, or its characters at all distinctly pointed out, by various writers, who have so successfully employed their time in the elucidation of many other subjects relating to ophthalmology. The following definition of pterygium copied from the voluminous *Treatise* of Demours, is an illustration of the imprecision of language and variability of opinion with regard to the pathological characters of the diseased production, so generally associated with this subject, and sufficiently illustrates the correctness of the statement I have previously made. "Le *ptérygion* ou onglet est l'epaississement variqueux d'une certaine étendu de la conjonctive, tant sur la sclerotique que sur la cornée. La portion épaisse de cette membrane devient mollasse; il semble qu'elle ait subi une macération partielle." Demours. *Traité, &c.* Tom. i. p. 342. Nor is the learned Clemens much more exact and definite in the language he has employed when treating upon this subject. "Hæc membranosa degeneratio," says he, "si crassior est panni nomine insignitur, si vero tenuior pterygium tenue seu ungula andire solet." *Scriptores Ophthalmologici Minores*, Vol. i. p. 127.

the inner canthus, but it may be situated at the temporal side of the eye, or at the upper or lower part of the eye-ball, and instances are not wanting in which pterygium has formed in all these situations at the same time, so that the points of the four pterygia have met upon the cornea and completely obscured the pupil. When, however, there exists only one pterygium, its more ordinary situation is towards the inner canthus, but it is by no means an infrequent occurrence to have two pterygia upon one eye, one arising from the inner and the other situated at the outer canthus. I may state upon this subject, as the result of my own experience, that the frequency with which pterygium occurs as respects the various parts of the eye, takes place in the following order:—first, the formation of a pterygium upon one eye, placed at the inner canthus;—secondly, the formation of a pterygium upon each eye, arising from the inner canthus;—thirdly, the occurrence of two pterygia upon one eye, one arising at the inner, and the other at the outer canthus;—fourthly, the formation of one pterygium alone, either at the outer canthus, or at the upper or lower part of the eye-ball, but not at the inner canthus. The occurrence of four pterygia upon one eye, the points of which have met upon the cornea and completely obscured the pupil, (and which constituted, in the opinion of Scarpa, the pannus of the ancients,*) I have never seen.

* Notwithstanding this statement of Scarpa, it will be found, on referring to many of the older writers, that they made a tolerable correct distinction between the pannus and pterygium as these diseases are respectively defined at the present day, or, at all events, that they did not consider the pannus to be composed of many separate pterygia. Ettmuller, speaks of pannus as a variety of pterygium. He says, when mentioning unguis, (which term he uses as being synonymous with pterygium), "tunica hæc non semper uniformis existet, nunc plana et albida esse solet et proprie tunica appellatur et unguicula. Interdum est carnosior et tunc dicitur pannus." The terms pannus

I have stated that pterygium generally forms at the inner or the outer canthus of the eye, and it was formerly pretty generally believed to have its origin from the lachrymal caruncle and semilunar membrane, its adhesion to which parts is however, as Mr. Wardrop long since remarked, by no means an essential character of the disease*

and panniculus were applied by Banister to what we should now call *pterygium carnosum*. "Est (Pterygium) in punctum duriusculum (unde pinna, pinnula) circa anguli oculi majorem nunc, nunc minorem, ex exasperato (excoriato) aut læso, eo loci, tunicæ adnatæ corpore, in initio albescens, sine dolore, lento passu protuberans prædictæque incumbens tunicæ, excrescentia, tractu temporis in lamellæ formam (unde ungula et unguis Latinis) superatàque prædictà tunicâ, quandoque ad et in corneam, de qua, in totum, ut de adnata, obtusiore instrumento, spatulâ &c. elevari potest, extensa, unde nomen quoque alæ accepisse verisimile est. Excrescentia hæc inveterata cartilaginea merè livescenteque, hic et alibi, tincta colore, prostat. Omnia hæc phænomena; ut supra videre est in panno ejusque speciebus contraria huic descripto morbo inveniuntur; quo respectu autem ab fungo fico &c. aliisque protuberantiis morbosis differat, explanabitur postea." Bidloo. *Opera Omnia*, p. 147. He has very elaborately treated of pannus and pterygium in separate sections of his work. "Quando membranula quædam *extrinsecus* in oculo nascitur, quæ super ipsam tunicam corneam atque pupillam se extendit, visuique graviter officit, *unguem* latini vocant, ob qualemcunque scilicet ejusdem cum hominum unguibus similitudinem, sive etiam *ungulam*; Græcis vero *onyx*, hoc est, *unguis* appellatur, itemque *pterygium*, id est ala vocatur præsertim quia quandoque alam vespertilionis repræsentat. Sed subinde mollis atque rubida, propter copiosissimas venulas, eadem apparet; adeoque tum pannus solet appellari. Saepius a narium interdum etiam a temporum parte ex angulis oculorum, quin imo quandoque vel a superiori, vel ab inferiori oculorum latere nascitur, indeque super ipsam corneam sensim protenditur. Nonnunquam leviter tantum atque non nisi per fibrillas tenues atque raras tunicæ corneæ adhaerescit." Heister. *Institutiones Chirurgicæ*, Caput lvii. Mr. Wardrop says it is the membranous pterygium which is usually termed pannus. (Vol. i. p. 24.) On making a hasty reference to Purmannus (*Chirurgia Curiosa*) and various other authors with especial reference to this statement, I am assured that Mr. Wardrop is in error. "Men of sense and experience" says Purmannus, "only make this difference, viz. that which is *white* and *thin* they call *ungula* or *pterygium*; and that which is *thicker* and intermixed with blood, proceeding from injured veins, *and looks fleshy*, they call *pannum*." (Page 67.) See also the opinions of Ettmuller and Banister just quoted.

* The definition of pterygium by the learned Sauvages implies its origin from the canthi of the eye. "Est," says he, "excrescentia cornea vel membranaceo-vasculosa ad oculi canthum exorta, alam

The form of pterygium is always more or less triangular, but it does not form a perfect triangle, for the point situated towards or upon the cornea is generally rounded and more or less obtuse, and the lines proceeding on each side, constituting the lateral outline of the pterygium, are a little inclined towards its centre, so as to present a slight concavity on each margin.

The cause of this triangular form has been well explained by SCARPA. He says, "the constancy of this fact (the triangular figure of pterygium) ought to be referred to the adhesion of the lamina of the conjunctiva becoming stronger as it advances from the circumference towards the centre of the cornea," and he adduces the progress of the disease in support of his assertion. The increasing strictness of the union subsisting between the conjunctiva and the sclerotica in proportion as those parts approach the margin of the cornea is also indisputably true; but as the form and rate of progress of pterygium depend in a great measure on the same cause, I shall proceed to describe the various stages of a common fleshy pterygium from its origin to its full development.

The first appearance of pterygium is indicated by a few

expansam referens, et versus corneam se extendens." *Nosologia Methodica.* Tom. 1. P. 156. "And first of the Web called *Pterygium Ungula deponenda*, or *Unguis vel Pannus membranosus;* which is a *Nervous* White Kind of Skin, beginning in the Corner of the Eye, adjoyning to the Nose; but afterwards if not timely prevented, spread itself over the *Adnata* and *Cornea*, till it has blinded the Eye. CARDILUCIUS is of opinion, that this *Pterygium* does firmly adhere to the *Adnata*, but I never found it so in all my Practice, but always loose, tho' of a long standing, and fit to be taken off." PURMANNUS. *Chirurgia Curiosa.* London, 1706. p. 67. "This distemper (pterygium) is visible of itself, there is a thick Membrane which takes its Rise from the great Angle, and extends itself over the whole Globe of the Eye." Translation of VAUGUION'S *Surgery.* London, 1715. p. 340. "Ptérigion, en latin *Pterigium.* Excroissance particulière et charnue dans les angles des yeux." WENZEL. *Dictionnaire Ophthalmologique.* Tom. 2. p. 63.

enlarged conjunctival vessels proceeding from the inner canthus (I will assume that to be its situation for my present purpose) and running in a direction nearly parallel to each other, at the same time there is an appearance of increased thickness in the conjunctiva just as though a fine web or film had been spread upon its surface; in a short time there is seen a small reddish or gray deposition situated at about two lines from the corneal and sclerotic junction, and the vessels proceeding to and terminating in it, begin to assume a more definite and distinct arrangement; by degrees this deposition near to the cornea becomes more apparent, it increases in size and approaches nearer to its margin until it reaches the line of union between the cornea and sclerotica, where it is seen to project above the corneal margin; the vessels proceeding to it now become more numerous, the texture in which they are placed increases in density and opacity, and its outline is rendered perfectly distinct by its elevation above the surrounding portion of the conjunctiva; it is also quite moveable, and may be raised more or less extensively from the sclerotica according as its connexion with the texture beneath may be merely *filamentous* or by a greater extent of more intimately connected surface. At this stage the nature of the disease is rendered quite evident, there is, in short, a red (generally red, but it may be brown, grayish, or of a dirty-white colour) triangular deposition beneath the conjunctiva which is gradually pointed towards the cornea, where it rises in a distinctly elevated projection around its margin.

The disease may remain in this situation before it makes any discoverable progress upon the cornea, but after a time, if no measures be employed to interrupt its growth, it continues its course, acquiring thickness and strength as it advances, until it appears like a triangular muscle, and may extend (gradually tapering as it proceeds) to the centre

of the cornea, particularly if a similar pterygium be advancing from the opposite side, when its point is much finer than in those instances in which no opposing pterygium exists.

During the progress of a single pterygium upon the cornea its base gradually increases in thickness and breadth, so that that part of the pterygium which was situated at the corneo-sclerotic junction when it size was small, and when it had not proceeded far upon the cornea, and which was then quite narrow, becomes broader as the disease advances; which is absolutely necessary to preserve the triangular shape of the morbid growth; for if its breadth did not increase in that situation, as the disease became in other respects extended in length and breadth, there must either have been a stricture at that part or it must have retained the same breadth to whatever extent it might afterwards proceed upon the cornea; or, to express myself more precisely, if the strictness of adhesion between the conjunctival covering of the cornea and its primitive layer had been alike over its entire surface and throughout its entire extent, and if that portion of the pterygium situated at the line of union between the cornea and sclerotica possessed a given breadth when the disease had proceeded upon the cornea for a short distance only, which breadth it had maintained without any variation when the disease had proceeded to the centre of the cornea, the breadth of the pterygium must have been equal from the margin to the centre of the cornea; but as the pterygium continues to possess the same triangular figure upon the cornea as it possessed upon the sclerotica, it is right to presume that the same variations, as respects strictness of adhesion, take place between the conjunctival covering of the cornea and its primitive layer from circumference to centre, as we have proved by anatomical evidence to exist between the con-

junctiva and the sclerotica, from its first connexion with the latter membrane at the periphery of the eye-ball to its termination at the margin of the cornea.

Although the progress of pterygium varies somewhat in different individuals and in different kinds of pterygia, there is, all other circumstances being equal, the same rate of progress maintained in all of them as regards their different stages, their growth being comparatively rapid prior to its approach to the margin of the cornea, stationary for a certain period when it arrives there, and much slower upon the cornea than upon the sclerotica. Such is, I believe, a correct history of the common fleshy pterygium, and of the rate of progress of pterygia in general in the various situations in which they may be placed; and these circumstances tend to substantiate that statement which was originally made by SCARPA, with regard to the anatomical explanation he suggested in reference to the triangular figure pterygium always assumes.

Now, it cannot be denied that the sclerotic conjunctiva is much more loosely connected to the sclerotica at the periphery of the eye-ball than nearer to the cornea, and that the increasing strictness of adhesion which exists between these parts as they approach the margin of the cornea takes place very gradually, and there is every reason to believe that the conjunctival covering of the cornea is much more intimately connected with that membrane in its centre than at its circumference, in proof of which, I may mention the facility with which the conjunctival covering of the cornea permits the enlargement of its vessels, or the extension of those which naturally terminate at the corneal margin, upon its circumference, forming, what is termed, vascularity of the cornea, and the extreme rareness with which these enlarged vessels extend to its centre; and I may further allude to the extension of ptery-

gium laterally when it has reached the centre of the cornea, and is prevented by the greater strictness of adhesion which exists between its conjunctival covering and primitive layer in this situation, from proceeding directly across that membrane; and lastly, in further corroboration of the probable correctness of my previous statement, I may direct attention to the frequency with which phlyctenulæ or pustules occur, at, and much towards, the circumference of the cornea (by which its conjunctival covering is elevated from its primitive corneal layer), rather than at its centre. However, it does appear to me, that this circumstance alone is scarcely adequate to produce the phenomenon in question, and I am of opinion that although the triangular figure of pterygium is chiefly determined by the increasing strictness of adhesion of the structures between which it is formed as it recedes from its base,—that is, as it approaches the circumference of the cornea,—whereby the extension of disease laterally is more and more limited, yet the diminishing size of the vessels (which have always a tendency to pass in a parallel direction with regard to each other) by lessening the nutritive supply, materially contributes to the production of this effect; for it is obvious, that a growth of this nature must be increased or diminished in size, in accordance with the increase or diminution of its vascular supply, and that consequently, as its vessels become smaller, the growth they support must also become smaller until it approaches to a point, which, in fact, takes place in the case under consideration, and constitutes the extremity or point of the pterygium. And this effect is the more probable inasmuch as the nutrient vessels of a pterygium run in a parallel direction with respect to each other, and do not ramify so diffusely as do similar tubes in other situations. I am aware that the latter part of my state-

ment is opposed to the views of Scarpa, who considers chronic varicose ophthalmia, nebula of the cornea, and pterygium, merely as degrees of the same affection, and believes the pterygium to be chiefly formed by, and composed of, varicose vessels, but I fully agree with Mr. Guthrie that this part of Scarpa's statement is by no means correct, and I found my opinion of its inaccuracy upon the following facts:—and first, the other and well known effects of chronic ophthalmia are widely different from pterygium; secondly, pterygium occurs much less frequently than it would do if it arose merely as a consequence of chronic ophthalmia; thirdly, the nebula of the cornea is quite distant in history, and dissimilar in character and appearance, from pterygium; fourthly, pterygium frequently occurs in the eyes of persons who have not previously suffered from any form of ophthalmia whatever; and besides it must be remembered that its appearance is neither preceded by, nor its progress attended with, pain.

There are certain varieties of pterygia which it is necessary to describe, but as they are all formed on the same principle, fashioned to the same model, and placed in the same texture, I shall proceed to explain the mode in which they are developed before pointing out those varieties, which, as regards their treatment, it is important to distinguish.

In the first place, there will be remarked a thin semi-transparent layer immediately beneath the conjunctiva—in the subconjunctival cellular membrane—in which blood-vessels are situated, which do not divide and ramify extensively, but pass onwards towards the cornea in a direction nearly parallel to each other; this deposition increases until, in the worst cases, it becomes a thick red mass, having a triangular figure, a flattened surface, and

fibrous aspect, much resembling a small muscle; the conjunctiva becomes raised and attenuated, so as to be expanded upon its front surface, and consequently reflected upon each side upon its posterior surface, from which it is again reflected upon the globe of the eye, so that you may raise it entirely from the sclerotica on each side, but in the middle of its under surface it is always adherent more or less extensively;—it is, in fact, adherent in consequence of the reflection of the conjunctiva on each side of its posterior surface to the globe of the eye. Thus it will be perceived that the disease called pterygium is developed in the subconjunctival cellular membrane, and is bounded (if I may be allowed the expression) in front by the conjunctiva, and behind by the sclerotica; its inferior and lateral parts resting upon the sclerotic conjunctiva. I am most anxious to fix attention to this fact, for, unless you have a correct notion of the precise seat of the disease, you will find yourselves quite at a loss to reconcile many of the explanations of the form and other characters of pterygia, which have been previously given. If you imagine that the morbid alteration in question is, as Scarpa represents, a congeries of varicose vessels placed *upon* the conjunctiva, which has degenerated into a thick and opaque tunic, or if you believe that it is a growth *from the surface* of the conjunctiva, the anatomical explanation of its form previously given cannot be considered correct, inasmuch as the nature of the anatomical connexion subsisting between the conjunctiva and subjacent parts, can only influence its form or determine its triangular figure in the situation to which I have alluded, that is, in the cellular texture intervening between the conjunctiva and the sclerotica.*

* Although Mr. Wardrop fully concurs in the accuracy of Scarpa's view, with respect to his explanation of the circumstance which determines the triangular figure of pterygium, the following quotation

Scarpa first explained the true cause of the triangular figure of pterygium, and anatomical investigations so strongly corroborate the probable correctness of his explanation, that until some more plausible one be offered, we are justified in pronouncing it to be a fact of established accuracy; but in reasoning upon the nature or rather upon the positive and precise structure of the pterygium itself, he reiterates his belief that it is not a new production but a *perversion* or *conversion* of a fine transparent membrane into an opaque and reddish-coloured tunic, and this opinion he entertains for the following reason—when the pterygium is removed from the cornea, that texture is denuded of its external covering. It is indeed quite true that on the removal of a pterygium from the cornea, the surface beneath is denuded to a certain extent of its mucous covering, but it is by no means an established fact that the pterygium is no new production, but a conversion of the conjunctiva into an opaque and reddish-coloured tunic, and if it were an established fact then, as I before mentioned, Scarpa's anatomical explanation of the cause of the triangular form of pterygium, cannot be admitted. I think you correctly understand what I am most anxious to explain, namely, that the notions of Scarpa with regard to the *seat* of the morbid change would induce a belief that pterygium consisted of an alteration in, and upon, the structure of the conjunctiva itself, whilst his explanation of its *form* applies only to a growth on deposition taking place in the subconjunctival cellular membrane, which is in fact the true seat of pterygium. And with regard to the denuded state of

from his splendid work *On the Morbid Anatomy of the Human Eye*, will show, that he has committed the same error as the venerable Professor, when describing its precise locality. "The cellular substance under the conjunctiva *sometimes participates in this disease*; in other instances it does not seem to be affected." (p. 27.)

the cornea on the removal of a pterygium, that is owing to the tardiness with which its conjunctival covering yields, and the small distance to which it is reflected upon its posterior surface at each side, compared with the extent to which the same occurrence takes place upon that part of it which is situated upon the sclerotica, of which you may readily obtain conviction by passing a probe behind that portion of a pterygium situated upon the cornea and that placed over the sclerotica—the distance to which the conjunctiva is reflected in the former situation will be found to be much less than in the latter, so that a portion of the cornea nearly equal to half the breadth of the pterygium is deprived of its conjunctival covering when pterygium forms upon the cornea, whilst merely a small linear or horizontal slip of the sclerotica, corresponding to the centre of the posterior surface of the pterygium throughout its whole length as far as the margin of the cornea, is destitnte of its conjunctival covering when pterygium forms in the latter situation. If you believe that the form of pterygium is determined by the anatomical peculiarity of the connexion subsisting between the conjunctiva and the subjacent parts (the nature of which has been previously explained) you must admit also that the morbid product so called, exists in the subconjunctival cellular membrane, for in no other situation could it (the anatomical peculiarity, &c.) exercise an influence sufficiently powerful to decide and determine its figure.

But it may be very justly said that deposition in the subconjunctival cellular membrane would sometimes have a tendency to become prominent, unless some counteracting power disposed it to assume a flattened aspect; and there are two circumstances in operation which determine this flattened aspect;—first, the facility with which the conjunctiva may be slightly detached for a great extent late-

rally, compared with the difficulty with which it may be considerably elevated at any one point;—and secondly, the pressure the deposited matter sustains from the palpebræ, either in their closed state or during their motions upon the eye-ball; on which account, indeed, almost all growths from the conjunctiva and growths and depositions within the subconjunctival cellular membrane, are flattened externally.

Pterygium generally occurs at or beyond the middle period of life, rarely in children, and still more rarely in infants; but Monteath,* Wardrop,† and others, have noticed it immediately or very soon after birth, so that they who are disposed to attribute its formation to chronic ophthalmia or previous inflammatory disease of the eye must admit that it may occasionally take place independently of such a cause, I mean in the case of congenital pterygium; unless indeed it can be supposed that such inflammatory affections of the eye may have occurred and preceded its formation during the period of uterine existence.

As pterygium occurs without pain, and is frequently discovered as it were accidentally by the patient himself, we cannot admit that it arises from inflammation in the strict sense of that term, but, in making this statement I must confess that it is not in my power to mention any cause adequate to its production—I am in short unacquainted with any satisfactory explanation of the causes of pterygium, and am unwilling to supply mere conjectures respecting it. Beer, whose experience must have been most extensive, believed that lime or stone dust give rise to pterygium, inasmuch as he has most frequently noticed it in mason's labourers, but although I have often treated the

* Translation of Weller's *Manual*, (foot note). Vol. 1. p. 218.
† *Morbid Anatomy of the Human Eye.* Vol. 1. p. 28.

eyes of this class of individuals for various diseases, I have no recollection of having seen one case of pterygium among them; their ordinary ophthalmic affections are, chronic ophthalmia; relaxation of the conjunctiva; thickening, opacity, and sometimes vascularity of the conjunctival covering of the cornea; indeed many of the cases of pterygium I have seen, occurred in persons engaged in farming employment. I am aware that very singular notions are entertained by authors respecting the causes of pterygium, and I may mention that BANISTER who wrote *A Treatise of one hundred and thirteene diseases of the Eyes and Eye-liddes*, more than two centuries ago, explains that this singular malady (pterygium), (the varieties of which he pretty clearly points out) may be had "by inheritance," and that it is also contagious; and it is even said to arise from metastasis—"passing from one eye to the other." PURMANNUS (*Chirurgia Curiosa*) has given a very elaborate account of the causes of pterygium as stated by former and contemporary writers. I am pretty certain that I have witnessed the occurrence of pterygium as a consequence of a blow upon the eye.

The varieties of pterygium which are entitled to separate description are three; namely, the membranous or *pterygium tenue*, which is merely a thin semi-transparent layer in which the course of the vessels may be very well observed;—2, the fleshy pterygium or *pterygium carnosum*, which resembles, in outward appearance, the fibrous structure of a muscle;—3, the adipose pterygium or *pterygium pingue*, which is chiefly of a white, soft texture, much resembling dirty adipose matter.* The latter form of pterygium is how-

* I copy the following case just as it is entered in my *Case-book*. WM. PUGH, aged 56, has pterygium in each eye.

Right Eye.—Characters of the pterygium:—A mass of well-defined (as respects its outline) though not much elevated, membranous

ever much less frequent than the two former. Sometimes the true sarcomatous pterygium is so thick and strong and its termination upon the cornea so peculiarly expanded, that it closely resembles a muscle, and, as in the case related by SCHMIDT, you might almost suppose that one of the recti muscles was misplaced; such a case very recently came under my care, and I performed an operation for its removal, more in compliance with the patient's wish than from any sanguine expectation of affording him relief, and, as I apprehended, the cornea had become so much disorganized that when the pterygium was removed from its surface it was found to be quite opaque, and vascular, and much thickened; and this, let me remark, is generally the case when pterygium of the sarcomatous kind has existed for some time, and becomes, as it now and then will become,

matter, exist at, and passes from, the inner canthus to the pupil, which it nearly covers. It does not arrive at a distinct point, but extends a little laterally. Within this membranous matter, many rather large and slightly tortuous vessels may be perceived, and one or two transparent vesicular bodies.

Left Eye.—There are two pterygia in the left eye, each possessing the characters of the preceding pterygium, except that the vesicular bodies are absent.

Remarks.—It is remarkable that these pterygia are situated very irregularly as respects the surface of the eye-ball—not, as is usual, in its precise transverse or its perpendicular diameter.

A somewhat similar example of disease is mentioned by MR. WARDROP. He says, "in one case, a small bladder, containing a pellucid fluid, was observed in the middle part of a pterygium." Cartilaginous pterygia are spoken of by RICHTER, WELLER, and WARDROP, and cancerous, and all sorts of malignant pterygia are described by ancient writers, which, I am unwilling to lengthen this *Section* by transcribing.

The characters of pterygia are delineated with variable degrees of fidelity, by HEISTER (*Institutiones Chirurgicæ.* Tab. 18. Fig. 1 and 2), WARDROP (*Morbid Anatomy of the Human Eye.* Plate 3. Fig. 1, 2, and 3), SCARPA (LÉVEILLÉ'S translation. Plate 2. Fig. 3 and 4), DEMOURS (*Traité des Maladies des yeux.* Planches 39—40), WELLER (MONTEATH'S translation of his *Manual of the Diseases of the Human Eye.* Plate 1. Fig. 9.), TRAVERS (*A Synopsis of the Diseases of the Eye.* Plate 6, Fig. 3 and 4.), and GUTHRIE (*Lectures on the Operative Surgery of the Eye.* Plate 2. Fig. 5 and 6).

expanded upon the cornea so as to obscure the pupil. In the case to which I am referring, the pterygium resembled a strong triangular muscle situated at the upper part of the eye-ball, which could be wholly raised from the sclerotica except at its posterior part, where a central line of adhesion was discovered, extending from its base to the margin of the cornea; this line of adhesion was chiefly composed of a double fold of the conjunctiva reflected on each side from the eye-ball to the posterior surface of the pterygium, but it was much more firmly connected with the cornea. Its base was traced upwards as far as the reflected fold of the conjunctiva, and its termination upon the cornea was rounded, obtuse, and in appearance though not in structure, tendinous. I removed this pterygium, in the presence of my respected friend Mr. Hodgson, under the circumstances and with the doubts respecting the utility of the operation, which have been previously mentioned, and the result was, as I have explained,—quite successless. Now, this is an occurrence which surgeons would be scarcely prepared to meet with, if they implicitly relied upon the authority of some writers, among whom I may mention Beer and Weller, Ware, Travers, and Mackenzie; indeed Mr. Mackenzie proceeds so far as to state that "when properly treated no trace of the disease remains neither over the sclerotica nor on the cornea;" an assertion which is quite at variance with my own experience, for whenever a pterygium has proceeded far upon the cornea, and has remained there for a long time, the texture of that part of it upon which the pterygium was situated has been invariably rendered opaque and quite incapable of transmitting light, and this opinion I perceive coincides with the great experience of Scarpa. The settlement of this point is of material importance in determining the propriety of an operation, for, if my view

of the subject be correct, then an early operation becomes necessary with the intention of preventing those changes in the texture of the cornea which are apt to arise if the disease be allowed to remain, but, if my opinion be erroneous, then, of course, no such necessity for promptitude in the application of the surgical remedy, can be requisite.

I have related the foregoing case at some length, because it was from a careful inspection of this pterygium that I was first enabled to ascertain that fact with regard to the seat of this morbid production, which I have perhaps explained with a tedious minuteness. On elevating this pterygium with the forceps for the purpose of removing it, I noticed that that part of the sclerotica from which I had raised it was still covered with conjunctiva, and that a probe could be passed on each side as far as its reflexion, and a close examination of the surface of the pterygium left no reason to doubt that *it* was also covered by the conjunctiva which was attenuated and expanded upon the whole of its front surface, and *nearly* the whole of its posterior surface; and the accuracy of this opinion has been fully corroborated by subsequent observation.

I have not alluded to the carcinomatous and malignant pterygium as they are sometimes termed, because such cases have never presented themselves to my notice, and as pterygium is allowed to be a disease, the progress of which is unattended with pain, I am not inclined to admit the existence of such a variety, although, of course, I do not mean to deny that almost any morbid product, however simple may be its characters at its origin, may be rendered irritable or malignant by mischievous and injudicious interference. I have, however, never known a genuine pterygium, properly treated, become cancerous, or assume any malignant character at all similar to that so circumstantially described by Mr. Guthrie.

I should have remarked at an earlier period of these observations, that in old cases of large sarcomatous pterygium, when the disease has arrived at the centre of the cornea, it spreads laterally so as to acquire a very obtuse extremity, and that in this way it may obscure nearly the whole of the pupil and destroy all useful vision; it does not proceed from the centre directly across the pupil—it does not progress in a direct and continued course, but covers the greater part of the cornea, by its expansion laterally when its progress has been arrested by arriving at its centre, so that eventually nearly the whole of the cornea becomes concealed and obscured; and this affords another strong illustration of the correctness of SCARPA'S explanation of the true reason why pterygium so invariably assumes a triangular form, and proves, in my opinion, beyond doubt, in conjunction with the facts, bearing upon this subject, previously mentioned, the truth and accuracy of his explanation.

Prognosis.—The prognosis of pterygium of whatever kind is favourable so long as it does not extend so far upon the cornea as to interfere in any material degree with vision; but, if it becomes spread out upon the cornea, or, if it extend so far as to destroy vision, and has been permitted to remain for a long period, the cornea will very probably have sustained those changes which will have impaired or destroyed its transparency ;* and these obser-

* MR. MACKENZIE concludes his opinions on the prognosis of pterygium in the following terms :—"When properly treated, no trace of the disease remains neither over the sclerotica nor on the cornea." The treatment recommended in his book is, then, it must be inferred, very improper, for *it* is quite inadequate to lead to the fortunate result he mentions as being so generally associated with *proper treatment.* FRICK states that the operation of excising pterygium is "perfectly simple, easy, and effectual," but he has made no reference to the effect of pterygium upon the cornea, when permitted to remain for a long

vations will equally apply whether one or more pterygia exist, and whatever may be their seat, except that one situated at the lower part of the eye is likely to produce more interruption to vision than one of the same size placed at its lateral or upper part.

Diagnosis.—Pterygium is easily distinguished from other depositions in the subconjunctival cellular membrane, and growths from the conjunctiva, by its form, its general appearance and the laxity of its connexion with the surrounding parts, and the same circumstances will distinguish it from pannus; besides pannus is generally occasioned by some prior disease, which it follows so promptly and regularly that there can be no mistake as to cause and effect; or else, there is some condition of the mucous lining of the lids present, adequate to account for the morbid state of the cornea; and lastly, it is never, as far at least as I have observed, very moveable upon the surface of the cornea, but is pretty closely and intimately identified with its structure. And independently of the want of that definite triangular figure in the disease termed pannus, (which triangular figure always characterizes pterygium when situated upon the cornea), there is no continuation of disease—no connexion of morbid structure upon the sclerotica. It is just possible that the state of the cornea alone might prevent you from distinguishing the one disease from the other, but, you will remember that when the cornea is affected with pannus, which assumes somewhat the semblance of pterygium, those appearances and

period, so that I apprehend in employing the word *effectual* as quoted above, he only refers to the effect of the operation in causing the absolute removal of the diseased structure; not intending to imply that changes in the corneal texture may have occurred from the continuance of the pterygium, which the excision of this morbid production is wholly inadequate to remove, whatever may be the mode in which its excision may be accomplished.

that structure which are termed, *the base or root of the pterygium*, are entirely wanting.

Treatment.—You may sometimes arrest the progress of pterygium by the use of astringents or stimulants, and the cases in which they are most usefully employed for this purpose, are, when for instance, the pterygium is small and has not been of long duration, and is actually increasing in size; the common zinc wash, or the nitrate of silver, or sulphate of copper drops, in the proportion of two grains to the ounce of water, are the best remedies for this purpose, and you may direct the patient to let a little of the one or the other, as you may prefer, be dropped upon the pterygium from a common capillary tube two or three times a day, and if by these means you can render it stationary and prevent its increase then you may suspend their use, for, it not uncommonly happens that when once their progress is arrested they will not again increase, or will at least remain stationary for a long time; but if they evince a disposition to enlarge, the same practice may be again employed. Escharotics were formerly used, but their employment is now pretty generally discarded from our remedial measures for the cure or relief of this disease, and very properly so, for undoubtedly they are very bad applications, and to them must be attributed many of those troublesome diseases into which pterygium may degenerate, from injudicious or mischievous treatment. Scarifications have been frequently employed, and I may say, successfully employed for the cure of pterygium, but it is a tedious and painful mode of cure compared with the operation of excision, that is, the partial excision of pterygia, for their *entire removal* is in many instances impossible, always unnecessary, and sometimes very injurious. If you are quite determined to remove every part of a pterygium from the surface of the cornea, you

will be very likely to exceed your intention, and to inflict that injury upon its texture which may be followed by staphyloma; and if you extend the operation very near to the inner canthus, a firm ligamentous band, marking the course of your incision, may extend from thence to the cornea, and greatly interfere with the abduction of the eye-ball.* Instead of dissecting the pterygium *from* the eye-ball, it has been proposed to *divide* it near the junction of the cornea and sclerotica, and before its adhesion to the former tunic becomes very intimate and extensive, or to cut away a small portion of it only; and again, with regard to the operation of excision, strictly so called, there are various modes of performing it, for whilst some recommend the operation to be commenced towards the basis, others again advise that the apex be first elevated and removed; and then, with respect to instruments, there has been much difference of opinion, and accordingly, knives of various curves with sharp and blunt extremities, lancets and scissors, and so on, have their respective advocates,†

* This circumstance is very clearly and forcibly pointed out by Scarpa, and his opinion is confirmed by Guthrie, by Frick and his Editor Mr. Welbank, by Mr. Travers, and many succeeding writers. The tendency to return of the disease, which Sabatier represents to be very great, but which is denied by Beer, Guthrie, and almost all subsequent writers, is said by Dr. Edmonston to be altogether removed by the excision of the pterygium. "In almost every instance," says the Doctor, "the removal of the pterygium has one good effect; the cicatrix formed on the cornea prevents any similar future production from extending in the same direction." I apprehend the return of the disease when it has been once cured, mainly depends on the mode in which its cure has been accomplished, and more especially on the more or less perfect manner in which an operation for its excision may have been performed.

† It has been suggested to tie the base of a pterygium very firmly with a ligature, and in this way to strangulate its circulation and cause it to slough. Vaughton has felt it necessary to censure with becoming gravity the following method of removing pterygium. "When" says he, "the membrane adheres to the cornea, some Practitioners pass a needle threaded with a horse-hair, under the pterygium, and bring this forward and backward to separate it."

but instead of mentioning them in detail, I shall proceed to describe the operation which my own experience and observation have disposed me to prefer, with such instruments as appear to me most suitable for use. It will, of course, be understood, that it is only when the pterygium is thick (fleshy), is increasing, and has extended for some distance upon the cornea, that its removal by a surgical operation is considered advisable, for in its slight forms, occasional scarification and the partial or complete division of its texture* will supersede the necessity of the more important operation, and at all events they will often be sufficient in conjunction with the other measures I have suggested, to prevent its material increase.

Operation.—You request the patient to lie upon a table or sit upon a chair, and having the eye-lids well separated by an assistant so as to expose the whole of the globe, (which should be steadied by the pressure of the index and middle finger on each side) you seize the pterygium with a pair of hooked forceps, and having raised it from the sclerotica, pass the probe-pointed blade of a pair of scissors underneath the elevated portion midway between its base

A history of the various modes of curing pterygia, (and particularly the operative proceedings), from their first and rudest state, to their present condition of comparative perfection, would furnish an amusing and whimsical, though not uninteresting account, of the application of ingenuity and skill to the relief of a very singular malady, which, even at the present day, is, with respect to many of its associated circumstances, very imperfectly understood.

* "Exhibet plerumque pelliculæ canæ speciem ungula raro vasa continet sanguifera. Si quæ adsunt, varicosa videntur et pterygii nutritioni destinata. Nam his vasis intersectis et pterygium sponte evanescere plus quam semel observavi." Clemens. *Scriptores Ophthalmologici Minores.* Vol. 1. 127. "When the disease has proceeded far on the transparent part of the eye, the only plan to adopt will be the removal of a part of the pterygium. This consists simply in raising the membrane as near as you can to the cornea, and cutting it through whilst suspended." Green's Lectures in the *Lancet* for 1823.

and the margin of the cornea, and having divided that portion, as far as its union with the sclerotica will permit, you turn the scissors to the opposite side, which you also divide in the same way; with a fine scalpel you then dissect and detach the pterygium from the sclerotica and cornea, by a succession of careful incisions, taking care that the flat side of the scalpel is directed towards the globe of the eye, so that its cutting edge shall be directed rather away from than towards it. If you employ a scalpel to make your first incision near the base of the pterygium, and cut from its front surface towards the globe, you may hack and injure the sclerotica or occasion unnecessary pain by partially dividing the pterygium in various places; or if, with a view of preventing the necessity of making several incisions and dividing the whole of the pterygium at once, you make one free section, you may either slightly incise or otherwise completely puncture the eye-ball; and if you place the scalpel underneath, and cut from within outwards as Mr. Guthrie recommends, you may raise the pterygium nearly half an inch from the eye-ball, and very probably *tear* it from the sclerotica or cornea rather than *divide* it; and this is not merely a theoretical objection but a matter of the most probable occurrence, and I have myself seen that portion of the conjunctiva situated at the upper part of the eye-ball, and which forms its point of reflexion, pulled quite downwards, and nearly the whole of the conjunctiva raised and stripped from the sclerotica and the eye-lid, during an attempt to detach a pterygium, situated at the upper part of the eye-ball, in the mode recommended by Mr. Guthrie. The scissors ought to be rounded at the extremity of that blade which is passed beneath the pterygium and pushed against the point of union between it and the sclerotica, lest it should penetrate or otherwise injure the eye-ball, and the same remark applies to any

and every instrument which you may think it right to pass beneath a pterygium for the same purpose, as it is quite impossible to prevent, in every case, by any care and precaution that may be employed, the sharp point of an instrument from hitching upon or puncturing some important part, in an unsteady eye, the muscles of which are contracting (as they will do under the excitement of an operation) spasmodically.

After the operation the eye should be bathed with warm water to encourage the bleeding, and the patient directed to keep the lids closed, but not firmly bound upon the globe, and in two or three days afterwards you would employ the zinc lotion to stimulate and quicken the healing of the sore; and, as soon as granulations arise, or as soon as lymphatic deposition occurs, you will carefully watch the healing of the part, encouraging or repressing the granulating process as circumstances may require, and take care to prevent, by an occasional inspection of the eye, what may occur if that organ be tightly bandaged and the eye-lids be permitted to remain in close contact with the eye-ball for several days without being moved—I allude to adhesion of the eye-lid to the eye-ball.*

* "It would also be very requisite to moisten a thin piece of Leather or Linen in it, as large as the Eye, and apply it between the Eye-Lids just upon the Eye, and let it lie two or three Days constantly upon it, which will both heal, strengthen the Eye, and prevent the growing of the Eye-Lids to the Eye, which too often happens, especially if any Error was committed in the Operation." Purmannus. p. 69. That this event may happen "if any error was committed in the operation" I am not prepared to deny, but no such event is *likely* to take place if the operation be properly performed—for it will be remembered that, from my exposition of the pathology of pterygium, it appears that the removal of this morbid production does not involve the extensive removal of the sclerotic conjunctiva, and as its palpebral part is untouched, union between these points cannot, by any means easily, occur. The parts are not placed in the same favourable condition for promoting the occurrence of symblepharon as when both the palpebra and the sclerotica are denuded of their mucous covering by the agency of lime or any similar substance.

Instead of raising the pterygium with a forceps, as I have advised, before dissecting it from the sclerotica and cornea, it was formerly recommended, for the same purpose, to pass a curved needle and ligature beneath it; you will find this direction particularly given by Banister,* Wiseman,† Purmannus,‡ Bidloo,§ Vaugion,‖ Heister,¶ Dionis,** Chandler,†† and by many other surgical writers; and they fancied it much assisted in the performance of the operation, and obviated that risk of injuring the eye-ball, which was otherwise incurred.

After the excision of the pterygium small portions of loose ragged conjunctiva may remain, or we may be unable to take away the whole of the pterygium at once, and in either of these cases it is desirable to remove the loose portions by means of the curved scissors at a subsequent operation, if they do not contract under the use of the astringent applications; at all events, it is better not to attempt to destroy them by the aid of strong caustic and escharotic substances.

SECTION V.—ADIPOSE DEPOSITIONS NEAR THE CORNEA.

In persons at the middle and at an advanced period of life, we may sometimes notice small adipose depositions

* *A Treatise of one hundred and thirteene Diseases of the eyes and eye-liddes.* London. 1622.
† *Severall Chirurgicall Treatises.* London. 1676.
‡ *Chirurgia Curiosa.* London. 1706.
‖ *Opera Omnia Anatomico-Chirurgica.* 1715.
§ *A compleat Body of Chirurgical Operations.* London. 1716.
¶ *Institutiones Chirurgicæ.* Amsterdam. 1739.
** *Cours d'operations de Chirurgie.* Paris. 1750.
†† *A Treatise on the Diseases of the Eye, and their remedies.* London. 1780.

near to the cornea and beneath the conjunctiva; they are of a dirty white colour, rarely larger than a barley corn, and seldom occasion a sufficient degree of inconvenience to render their removal necessary. They sometimes extend as far as, and even just upon, the margin of the cornea, so as to produce a slight personal defect, but as this happens at that period of life when individuals generally are not very tenacious as regards their personal charms, we are rarely called upon to remove them, as in the case of small pterygia which form in early life and constitute a much more unpleasant personal defect. I have never seen these pingual or fatty depositions acquire a greater magnitude than that of a barley corn, nor have I known them take on any malignant action however long they may have existed, and you will have remarked that growths, or, if you prefer the term, depositions of such a nature, rarely, if ever, evince a tendency to assume malignant action, unless irritated by officious and improper interference. Whenever there exists a predisposition to their formation, there is generally two of them upon each eye, one at the inner, and another at the outer side of the cornea; sometimes however there is only one upon each eye, and whenever this occurs they are always in corresponding situations; I have never yet seen a case in which one of these fatty depositions occurred in the inner side of the cornea in one eye, and, at its outer side, in the other. You may request your patients to use a little zinc or alum lotion, if they wish to have them attended to, and you will do no harm in cutting them off, if the depositions are larger than usual and the patient is very desirous of having them removed; but I may repeat that they are harmless in their nature, do not acquire a large size, and excite little, and, for the most part, no irritation.

SECTION VI.—FUNGUS OF THE CONJUNCTIVA.

The conjunctiva is subject to a variety of fungoid growths, the more frequent of which are those small vascular productions which arise from the palpebral portion of the conjunctiva described in *Section* 2, and the following variety, which I proceed to describe:*—A small, red,

* There is a curious statement relative to fungus of the conjunctiva in Mr. Travers' *Synopsis* (page 99) which is not characterized by the author's usual precision of language. He says, "there is a malignant fungus of the conjunctiva, for like the mucous membrane of other parts, this is sometimes the seat of carcinoma." I have seen nothing of this kind in the course of my own practice. I shall have occasion to explain the condition of the conjunctiva in connection with malignant disease, when speaking of cancer and various forms of ulceration of the eye-lid, and malignant diseases of the eye-ball. In the large work of Demours *(Traité des Maladies des Yeux)* there are several figures exhibiting a somewhat large convex tumour of the conjunctiva, with the mode of removing them by means of the scalpel and scissors. He has also illustrated the appearance produced by palpebral tumours when made to project the conjunctiva by everting the lid. There is no account whatever of fungus of the conjunctiva in Mr. Wardrop's *Morbid Anatomy of the Human Eye*, which I conceive to be an inexcusable omission in a work devoted exclusively to the representation of the pathological changes wrought in the various textures of the organ of vision, inasmuch as the disease in question is by no means rare, unimportant in its consequences, or incapable, from its characters or seat, of correct delineation. Had this excellent writer repeated upon the second edition of his useful publication the labour he bestowed when arranging the materials of the original work, his readers would have had fewer omissions to regret, and its author would have been spared the awkwardness of apologizing for his want of leisure or inclination for further study and research, by stating "that although twenty-six years have elapsed since the *Morbid Anatomy of the Eye* was first published, the care with which he selected the materials is satisfactorily proved by the circumstance, that subsequent researches in this interesting department of Pathology have not contributed any additional facts to render any alteration in the work desirable." The same spirit of self-complacency appears in the following statements. "In a careful review of this *Treatise* in its passage through the press, I have not seen occasion to make any material alteration." Travers. Preface to the third edition of his *Synopsis*. "In reprinting this work, I only find it necessary to add, that there is no single book extant containing so much information on the subjects of which it treats." Guthrie. Preface to the second edition of his *Lectures on the Operative Surgery of the Eye*. It is in vain for authors to attempt to fix the limits of knowledge, however much they may congratulate themselves on the result of their individual labours.

spongy, vascular structure, sometimes arises upon the sclerotic conjunctiva, but more commonly at that part near to the cornea, having a very fine and delicate pedicular attachment to the conjunctiva, and bleeding rather freely on the slightest laceration; it is not originally flattened, but in consequence of the pressure it sustains during the movements of the lids upon the eye-ball, it acquires a slightly convex form externally, somewhat similar to that of a very small mushroom, being much thinner and somewhat less prominent at its circumference than in its centre; it is generally of an oval or round shape, and if a probe be passed underneath it, it may be easily raised from the conjunctiva, except at its central point, where it is attached by a slender pedicular neck to that membrane. It will be perceived that these fungoid growths are moulded posteriorly to the shape of that part of the eye-ball upon which they are situated, and to the form of the under surface of the eye-lid, on their external aspect, and that in this way they acquire and assume the figure we have represented them to possess. The external surface of these fungoid productions is generally granular, it consists of a series of minute globular elevations surrounded by narrow clefts or furrows—and when these granulations acquire a large size, they form, as it were, separate fungi.

If I were to state merely the product of my own experience I should say that it is an extremely rare occurrence for more than one of these fungi to form upon one eye, but perhaps my experience may not correspond with that of other surgeons who have witnessed a greater number of these cases than it has fallen to my lot to notice. I have sometimes known them acquire a very large size, so as to obscure nearly the whole of the cornea, and a great portion of the conjunctiva, (for these morbid growths are not covered by the conjunctiva—are not developed in

the subconjunctival cellular membrane, but arise or grow from its surface) still, however, preserving the same characters as respects structure and figure, and in every instance they have been distinctly moveable, and most readily cured by a very simple operation. People are sometimes much terrified and very apprehensive respecting their nature, and will solicit your opinion with the most alarmed and anxious feelings. If you had not seen growths of this description before, and if you were neither theoretically nor practically acquainted with their nature, you might not be able to gratify your own feelings by tranquillizing theirs—you might not be able to say, with confidence in the truth and accuracy of your opinion, that the disease was not of a serious or malignant character; they are, however, of a most harmless description and although they more commonly form at the middle or at an advanced period of life I have never known them do otherwise than perfectly well, when judiciously managed.

Although I have been very desirous of ascertaining the real cause of these growths from the conjunctiva, my efforts have been very unsuccessful, and many of the instances which have fallen under my care have occurred in farmers labourers who have neither received a blow upon the eye, been affected with attacks of acute ophthalmia, nor, from the nature of their avocations, subjected their eyes to any undue exertion either in the inspection of minute or glittering objects, or in the more exhausting application connected with literary pursuits.

Treatment.—I have stated that these fungoid growths are usually connected with the conjunctiva by a delicate pedicular attachment, and that a probe may be readily passed around them at every other part, so that nothing can be more easy than their removal, which may be accomplished either by means of a probe-pointed pair of

scissors, or, if you prefer it, the following plan may be adopted—raise the fungoid growth by means of a hooked forceps, and divide its neck, with a fine scalpel, close to the conjunctiva, but if a large portion or fragment of the fungus should remain attached to the mucous membrane owing to the incision of its pedicle being made at too great a distance from the conjunctiva, it should be removed with a pair of scissors the blades of which are convex on that side towards the eye-ball. It is advisable to recommend the use of a weak solution of the nitrate of silver, or of the sulphate of copper, night and morning, for a few days afterwards, and it may be sometimes necessary to combat inflammation or remove ecchymosis which may have been excited by the operation.*

* Mr. Travers and others have pointed out a fungoid growth from the conjunctiva, which, according to his statement, proceeds from the point of reflexion from the lids to the globe, but which I have never known to have acquired the very large size mentioned by this excellent writer in his *Synopsis of the Diseases of the Eye.* (p. 99.) A fungoid state of the conjunctiva has also been mentioned, in which that membrane has been converted into a pulpy fungoid mass, but I have only noticed the existence of this condition in its palpebral portion, the vascular and granular condition of which has been already described. Of course I do not mean to say that fungoid growths may not acquire almost any degree of magnitude here, as in other situations, if they are permitted to proceed unarrested by the employment of any repressive measures, but merely to assert that I have not witnessed any case in which these growths have attained so vast a magnitude as to project considerably between the lids, and, by their pressure, destroying the eye. Mr. Mackenzie speaks of two varieties of fungus of the conjunctiva, which acquire a large size and destroy the eye-ball by their pressure and lead to other serious effects, as though he had frequently had an opportunity of observing this calamitous occurrence, and he closes his account of a malady which is very trifling at its origin and exceedingly simple in the treatment then required for its cure, with the following melancholy statement. "When fungus of the conjunctiva has been allowed to proceed in its course till the eye-ball by its pressure, is destroyed, it would be difficult to remove the fungous growth by itself, and it is quite unnecessary to attempt to do so. In such cases, we must have recourse to extirpation of the eye-ball, taking care also to remove any part of the fungus arising from the inside of the eye-lids." (page 201.)

SECTION VII.—WARTS AND TUMOURS GROWING FROM THE SURFACE OF THE CONJUNCTIVA, AND TUMOURS WITHIN THE SUBCONJUNCTIVAL CELLULAR MEMBRANE.

WARTS.—Warts sometimes form upon the conjunctiva, and MR. TRAVERS has, in my opinion, very properly considered them to bear a certain analogy to the same morbid formations occasionally seen upon the mucous surface of the prepuce. The circumstance of their arising most commonly at the fold of the conjunctiva where that membrane is reflected from the eye-lids to the eye-ball, upon that part of the conjunctiva also nearly at its junction with the skin of the palpebra, at the angles of the eye-lids and borders of the tarsus, where vitiated secretions would be most likely to lodge, and consequently to excite every degree of irritation and every variety of mischief the degenerated quality of such secretion is capable of producing, affords a powerful argument in support of the probable accuracy of this conjecture. Of course these warty excrescences produce a good deal of irritation, and give rise to a more or less severe degree of ophthalmia, which render their removal advisable. In their own nature they are perfectly harmless, but you will readily imagine what will be the effect either of the friction of a rough warty excrescence upon the eye-ball, or, of its intervention between it (the eye-ball) and the lids.

Treatment.—The best and most approved treatment of warts upon the conjunctiva consists in their removal by a surgical operation; no collyria with which I am acquainted are sufficient to cause their removal, and no local applications will take them away, unless they are of a quality and strength which would be highly injurious to the eye itself. If escharotics are employed the cure is

always tedious and is not generally effected until severe ophthalmia has been several times induced.

Operation —As these warty excrescences are sometimes flat and broad, and, in other instances, prolonged and slender with a very trivial extent of attachment to the conjunctiva, a slight difference in the mode of accomplishing their removal will be required in accordance with the particular variety of verrucous formation which may be the subject of operation. If their base be broad they are most effectually removed by means of a fine scalpel and a pair of hooked forceps ;—you elevate the warty excrescence with the double-hooked forceps and detach it from, and close to, the conjunctiva by a single cut with a fine scalpel, or, you may snip it away with a pair of scissors (the blades of which are convex towards the eye-ball) if its attachment be particularly fine and slender; or, you may cause its removal by applying a strong hair or a little fine silk very tightly around its base.

Tumours.—Tumours of various kinds grow from the surface of the conjunctiva, but they are found much more commonly, in its subconjunctival cellular membrane.* It

* In that chapter of the great work *(Institutiones Chirurgicæ)* of Heister which treats *De tuberculis sive carnibus excrescentibus, sarcomate et hypersarcosi, quæ oculum inter et palpebras nascuntur*, he has pointed out many interesting circumstances connected with the history and treatment of conjunctival tumours, and has subsequently represented (Tab. 15) two examples of this curious disease. Demours *(Traité des maladies des yeux)* has explained the means of distinguishing pterygium from those "excroissances soit charnues soit d'une nature presque cartilagineuse qui viennent sur la conjonctive ou sur la cornee, ou qui ont leur siége partie sur l'une et partie sur l'autre de ces membranes." He has also delineated several varieties of conjunctival tumours (plates 17, 39, 41.). Weller (Monteath's translation) has copied from Beer an account of papula of the conjunctiva, which he describes as "a roundish pretty hard, pale red, and itchy little swelling." He says if it be rubbed it sometimes "acquires the size of a pea in the course of three days." (p. 223). "Adipose, steatomatous and even cartilaginous tumors form in the cellular tissue of

is not necessary for me to present you with a formal description of each and every tumour which occasionally exists in these situations, for, in fact, they are similar to many of the same formations so frequently noticed in the same tissues in other parts of the body. When situated upon the surface of the conjunctiva they are generally of a firm steatomatous nature and are very readily removed by means of the hooked forceps and a common scalpel, but when situated within the subconjunctival cellular membrane they are almost always encisted, and are very loosely connected to the subjacent tunic, and are consequently removed without the slightest difficulty by merely dividing the conjunctiva and drawing them from the cellular texture in which they are situated. However this process is not always necessary, for, as their contents are in nearly every instance fluid, a mere puncture of the cist with a lancet will be sufficient for their cure. Two instances have occurred in my own practice, where, on dividing the conjunctiva with a view of removing the cist in an entire condition, an hydatid has escaped and rendered any further measures unnecessary.* Hydatids—

the sclerotic conjunctiva. The conjunctiva also at the point of its reflexion from the lid upon the globe occasionally forms a tumour of considerable magnitude. I have seen it projecting from beneath the upper lid equal in bulk to a middle-sized walnut, producing great distortion and inconvenience, and rapidly increasing so as completely to cover the eye." TRAVERS. *A Synopsis, &c.*, p. 279. Conjunctival tumours are briefly referred to in the work of DR. FRICK, (page 89) and also in that of MR. MACKENZIE. (page 202.)

* "The hydatides of the adnata and cornea are generally cured by a puncture or incision made into them, and by bracing the parts afterwards with some of the gentle astringent or strengthening medicines." *An Essay on the Dropsy and its different species*, by DONALD MONRO, M.D. p. 157. London, 1756. TURNER mentions, in the second volume of his *Art of Surgery*, "an uncommon Disease of the *Tunica Conjunctiva*, occasioned by a small Worm with many Feet, somewhat bigger than the *Cyrones, (described in my Treatise of the Skin Diseases)* bred under the White of the Eye, and occasioning the most intolerable itching thereon."

simple watery cists—the tumours termed meliceris and atheroma—growths of a firmer consistence, and occasionally the formation of hairs without bulbs growing from the internal surface of encisted tumours, have all occurred in this situation (in the subconjunctival cellular membrane) in the course of my own experience, and most of them have fallen under my notice very many times.

SECTION VIII.—ALTERED STATE OF THE CONJUNCTIVAL SECRETION.

There is an account of an arid condition of the conjunctiva in Mr. MACKENZIE's work on the *Diseases of the Eye*, which he has connected with a peculiar shrivelling of its texture. I have not until very recently met with any correspondent case,* although I have many times noticed a

* I have within the last few days seen a young man (Joseph Plant æt 24, residing in Deritend) who is nearly blind from repeated attacks of ophthalmic inflammation. The lachrymal puncta have apparently never been formed, but the lachrymal gland still secretes though in a very trifling degree, and its secretion is poured, by its usual ducts, over the surface of the eye. The corneal and sclerotic conjunctiva are raised from the membranes they cover; they are dry, shrivelled and opaque and have ceased to secrete their accustomed lubricating fluid. The palpebral conjunctiva resembles fine skin; is of a reddish colour like skin which is not covered by a cuticle of ordinary thickness; and is reflected upon the eye-ball almost immediately behind the tarsal margin.

I have recently had an opportunity of reading in the *Lancet* (for November 29, 1834) an account of a shrivelled state of the conjunctiva, related by MR. WARDROP, which in some respects resembles the case I have just given from my notes. The experienced author has entitled the case "A remarkable lusus of the lachrymal organs and conjunctiva," and thus describes it. "The subject of this remarkable lusus was a female, who, when brought to me, had reached her twentieth year, and appeared to me in every respect healthy.

About three days after birth, it was remarked that her eyes had not the usual lustre of those of other infants, and that they looked opaque and dry, being completely deprived of tears even when the child was

diminished secretion from the conjunctiva sometimes attended with a diminution of the lachrymal fluid; and the

labouring under the most violent passion or affliction. These deviations from the natural appearance became more and more distinct as she advanced in life, but for many years her eyes had undergone but little change.

When I examined them, instead of finding the eye-balls moistened with tears, the whole conjunctiva appeared to be converted into a dry cuticle, resembling a thin dried bladder, sufficiently transparent to permit the sclerotic coat and cornea to shine through it, and be distinguished from one another, but so opaque as to destroy vision, as she was able to see merely the outline of large objects.

On tracing the conjunctiva from the eye-ball over the palpebra, it presented the same shrivelled and dried appearance, but instead of extending posteriorly, as in the natural eye, there was a deficiency in that prolongation of the membrane, so that the eye-lids adhered to the globe, and neither could be separated far from it, nor could the edges of the eye-lids be brought sufficiently together to cover the eye-ball. She was observed always to sleep with her eye-lids open, and when she attempted to shut them, she experienced a good deal of uneasiness, while the frequent endeavours to do so produced a tendency to entropium of the upper eye-lid. The natural sensibility of the corneal and sclerotic conjunctiva was so much diminished that the surface of the eye, when touched, gave but very slight uneasiness. The lachrymal puncta of each eye were open, and I could squeeze through them, from the lachrymal sac, a small quantity of a sebaceous fluid.

As it seemed probable that the change in the structure of the conjunctiva arose entirely from an absence of the lachrymal fluid, and as there was no reason to believe that the want of tears arose from any defect in the organization of the lachrymal glands, but from a defect in the usual place where the lachrymal ducts terminate in the upper eye-lid, these adhering to the eye-ball and thus effacing the lachrymal puncta, it occurred to me that if an artificial opening was made between the eye-ball and lid, extending into the lachrymal gland, an artificial channel for the tears might be established."

Mr. Wardrop subsequently acted upon this view of the case, and performed the requisite operation. "I introduced" says he "a thin sharp-pointed knife between the eye-ball and tarsus, towards the upper and temporal angle of the right eye, pushed it forwards at the place where the natural ducts are situated, and carried it to the site of the lachrymal gland, at which place I made a free incision; a good deal of blood flowed from the wound, and I afterwards introduced into it a piece of lint with a view of preventing the adhesion of its edges.

On the following day the eye-lids were much swelled, and she complained of so much pain in the wound, that I removed the lint. The whole surface of the conjunctiva had now become moistened and pliable, but whether this was occasioned by a puriform or lachrymal discharge I could not ascertain." The operator soon afterwards lost sight of the patient so that the result of the case is not known.

symptoms which characterize this malady, (if it may be called one) are, a peculiar tardiness and very unpleasant stiffness in the movements of the lids upon the globe. It is also a symptom of approaching inflammatory disease of the conjunctiva, and often presents one of the earliest indications of acute ophthalmia. There can he no doubt respecting the occasional existence of this arid state of the conjunctiva, and the propriety of applying some oleaginous fluid, and of adopting various other measures whenever the natural secretion is either partially or wholly wanting; at least in every case where this dry condition of the conjunctiva is not clearly and unequivocally proved to depend on some disease (such, for instance, as acute conjunctivitis, or other inflammatory affection of the eye) which is remediable by other measures.

If the conjunctival secretion were wholly suspended you would not expect the surface of the eye to be absolutely dry—its surface would still appear polished, and smooth, and moist, owing to the diffusion of the tears upon it, but of course the free movements of the lids upon the globe, would, as I have already stated, be much interfered with, for the freedom of these movements appears to depend in a great measure on the secretion of a due quantity of that matter of which the healthy conjunctival secretion is composed.

The conjunctival secretion is also occasionally changed in other respects, its natural characters are altered, and it becomes either more or less tenacious than it ought to be, or its consistence varies from a perfectly healthy and natural state, in short, its quantity or quality are in some manner or other, morbidly altered. These variations in the state of the secretion of the conjunctiva depend, in the general, on particular diseases of that membrane, which have been already pointed out, and it will not now be necessary to repeat what has been said respecting their

treatment. We can, then, only recognize in this altered state of the conjunctival secretion, disease of some one (generally the conjunctiva) or more of the textures of the eye, or some constitutional defect. Undoubtedly constitutional defects may suspend and modify the secretion from the conjunctiva independently of the production or the existence of perceptible disease in the texture of that mucous membrane, and when this occurs the method of treatment it may be necessary to adopt is sufficiently obvious.

The lachrymal and conjunctival secretions are very often impaired at the same time—if the one is lessened, the other is very liable to be diminished also—and this is owing to the intimate nervous connexion subsisting between these parts (ZINN, SOEMMERING, SWAN, DALRYMPLE.) In fact, the secreting function of the conjunctiva is especially prone to be deranged from various morbid conditions of the fifth pair of nerves and many of its numerous ramifications. The disease must, therefore, be viewed comprehensively as a part of general pathology, not separated for the employment of treatment of a purely local nature, as though it were sufficiently remediable by the use of eye-washes and eye-salves which are so generally recommended for the relief of defects of this nature by those who are unacquainted with the cause of the various harassing symptoms which arise from changes in the qualities and diminution in the quantity of the conjunctival secretion.

SECTION IX.—INJURIES OF THE CONJUNCTIVA, AND FOREIGN BODIES WITHIN ITS SUBSTANCE, BETWEEN ITS FOLDS OR BENEATH ITS SURFACE.

The conjunctiva is subject to a great variety of diseases produced by external violence, the principal of which are, 1, burns;—2, contusions;—3, lacerations;—4, and irritation excited by the presence of foreign bodies. Various substances applied to its surface give rise to a high degree of inflammation or effect sudden and important changes in its texture.

BURNS OF THE CONJUNCTIVA.—The injury the conjunctiva may sustain from the contact of a heated substance, may be considered as primitive and as secondary, and will depend, *first*, on the nature of the heated body; *secondly*, its degree of heat; and *thirdly*, the duration of its application. The distinction between its primitive and its secondary effects consists not altogether in inflammation and its consequences, for the heat of the burning substance may be so considerable, or it may be applied for so long a time that the texture of the conjunctiva may be at once destroyed, and cannot, therefore, admit of any subsequent change. The application of a heated substance to the conjunctiva may merely induce inflammation, or it may cause superficial abrasion and destruction, or, as I have just mentioned, it may at once destroy its entire texture.

If inflammation merely take place, it must be treated exactly in the same way as inflammation occurring from any other cause. If the surface of the conjunctiva be slightly blistered* or abraded, some warm, mild, bland fluid

* "L'action du feu cause une phlyctène qui s'ouvre assez promptement et laisse un ulcère ordinairement peu dangereux, lorsque l'accident est léger et qu'il n'y a point de principe spécifique dont l'action puisse être dirigée sur l'œil par cette cause d'irritation."

will be the most suitable application for the first day or two after the infliction of the injury, when a slightly stimulating lotion will be more useful, its strength being gradually increased until the process of cicatrization is completed. But if the amount of injury be still more considerable, if, in short, the texture of the conjunctiva be quite disorganized, it will be right to guard as much as possible against the occurrence of inflammation in the deep-seated textures, and to apply a little sweet oil to the

Demours. *Traité des Maladies des Yeux*. T. 1, p. 223. It will be remarked that the word *phlyctène* as employed by Demours in the preceding paragraph affords an example of that great imprecision of language which so frequently occurs in the voluminous work of that laborious writer. "If the eye should be scalded by boiling water, a vesicle forms, as in other parts, and inflammation ensues, which must be treated accordingly. The vesicle turns generally white, bursts, loses its shape, and is gradually thrown off like a slough from any other cause, frequently leaving behind it a chronic state of inflammation, of an intractable nature." *Lectures on the Operative Surgery of the Eye*, by G. J. Guthrie. London, 1830, p. 155. I apprehend there can be no reasonable doubt that when a vesicle of this description "bursts" it is very liable to "lose its shape;" but I can scarcely understand how this *shapeless vesicle* can be "thrown off like a slough from any other cause." The extent of the injury will, of course, determine the formation of a vesicle, but it is quite certain that they occur only after the moderately severe burns and scalds of the conjunctive membrane; for it is evident that a very slight scald of this texture, though it may induce inflammation, is inadequate to produce a distinct vesicle, although it may give rise to a trivial, but not circumscribed, degree of subconjunctival œdema; and on the other hand a very severe injury of this nature, will, according to its degree, rapidly destroy the life of the tissue and absolutely prevent the formation of a vesicle, by rendering the part incapable of retaining any fluid which may be effused as an effect of the inflammation of surrounding parts consequent on the injury.

The following curious case is mentioned by Sabatier (*De la Médicine Opératoire*. T. 3, p. 3.) "Fabrice de Hilden s'est conduit de la même manière pour ôter de dessous la conjonctive une parcelle de plomb qui s'etait glissée derrière cette membrane. Le malade était un enfant qui avait jeté imprudemment du plomb fondu dans de l'eau. Il se fit une explosion violente, et il fut frappé à l'œil par deux parcelles de ce métal, dont une s'était introduite dans l'epaisseur de la paupière supérieure, et l'autre était entrée dans l'œil. Fabrice regarda comme une circonstance heureuse d'avoir pu faire sur-le-champ l'extraction de ce corps; car si l'on eût tardé il aurait pu survenir une inflammation accompagnée de symptômes très-graves."

injured part. After the more immediate consequences of the injury have passed by, applications varying in their nature in different cases will be required, but slightly stimulating lotions are usually most suitable. During the progress of cicatrization it is desirable to move the lids upon the eye-ball occasionally, and not keep them constantly bound down lest *symblepharon* be produced. To assist in preventing this untoward occurrence it will be prudent to drop a little olive oil upon the raw and granulating surface three or four times a day. Much may be done to lessen the deformity and defects these accidents have a tendency to produce, by skilful and judicious management on the part of the surgeon to whose care they are originally confided, for, independently of symblepharon there are many other accidents (of minor importance it is true, but sufficient to constitute an objectionable personal blemish) which may otherwise take place and which it is of great consequence to prevent, such, for instance, as entropium, ectropium, the formation of frenular adhesions between the eye-ball and the palpebræ, and great limitation to the movements of the globe of the eye, by which the sphere of vision is much diminished. It may indeed happen in spite of every exertion that a frenular adhesion may occur between the eye-ball and the eye-lids, or a patient whose case you have not managed from its commencement may apply to you for relief under such circumstances, and you might judge it necessary to perform an operation for the removal of the defect, and I shall point out the mode of performing such operation when I speak of the morbid affections of the appendages of the eye.

These measures comprise the local treatment of those cases in which we are presumed to be capable of preventing suppuration of the eye-ball, but as you will be aware,

these accidents are always attended with a certain amount of ophthalmic inflammation, which is not always confined to the outward tunics nor invariably commensurate with the actual degree of local mischief or injury, for, owing to the varied susceptibility of different individuals, you may have to encounter a violent degree of ophthalmic inflammation originating from a slight injury, in one individual, while in another whose susceptibility to disease of this organ is not so great, a very violent degree of local injury may be succeeded by only a slight attack of inflammation of the eye. Be therefore cautious, watch carefully the state of the various tunics of the eye after an accident of this nature, and do not suffer your patient to have a closed pupil or to become amaurotic for want either of the care or the ability to distinguish and cure deep-seated inflammatory mischief, as far as they are distinguishable and curable, whilst you are intent solely upon relieving a less important injury.

The effects of scalds upon the conjunctiva are so exactly similar to those of burns that it will not be necessary to treat of them separately—what has been said of the latter applies equally well to the former. But there is one other form of injury to which I will direct attention for a few moments,—I allude to the introduction of gunpowder into the texture of the conjunctiva. Whenever you can remove the grains of gunpowder from this membrane it is desirable to do so, as soon after their introduction as possible, on account of the very great personal deformity to which their presence gives rise. Any fine sharp-pointed instrument will enable you to accomplish this object whenever they are situated superficially, but if the grains of the powder are forced deeply into the texture of the conjunctiva you cannot remove them without inflicting a greater degree of injury than it would, under all the circumstances of the

case, be desirable to excite. With this exception there are no particular rules for the management of these accidents, or rather, for the management of the inflammation with which they are usually attended.

Contusion of the conjunctiva.*—A blow upon the eye may be limited in its effects to the conjunctiva, or it may of course be productive of injury varying in its extent with the nature of the injurious agent and the force of its application. Presuming however that its effects are limited to the conjunctiva, what are their varieties? and how are they distinguished? In the first place the injury may be so unimportant, that it may only induce a very trivial and temporary redness of the conjunctiva with a slight effusion either of a serous or sanguineous character into the cellular texture beneath, which may very speedily disappear; or, secondly, it may give rise to an attack of acute conjunctivitis which will require the same treatment as acute ophthalmia arising from any other cause; or, thirdly, it

* No contusion of the eye, however slight, should be neglected simply because it is not immediately succeeded by any decided symptoms of inflammation. If the eye be slightly contused it will often happen that no ophthalmia—no material ophthalmia—will result if the person sustaining the injury will abstain from employing the eye in active vision, and adopt the precaution of lowering the diet, bathing the injured organ, &c. but, on the contrary, if all this is neglected, and if the organ be worked as usual, it is by no means uncommon for a troublesome and obstinate inflammation to occur—the eye being as a consequence of the injury disposed to be unusually susceptible of its natural stimulus and of every injurious impression, so that I am in the habit of requesting persons suffering from even trivial injuries of this nature to exercise great caution for at least a few days after the accident, even although there may appear to be no present necessity for the precautions I am suggesting. Such I perceive is the represented result of the great experience of M. Demours. "Les contusions (says he) légères en apparence sont quelquefois des causes d'irritation suffisantes pour donner lieu à des douleurs opiniâtres. Les accidentes sont plus graves s'il y a une prédisposition, comme je l'ai dit plus haut. Très-souvent les désorganisation d'un œil, suite de contusion, est une cause continuelle qui menace l'autre œil d'engorgements plus ou moins funestes." T. 1. p. 224.

may produce, what is termed, subconjunctival ecchymosis,* and as this is the most frequent result of such an accident, and the one, most generally requiring surgical aid, I shall proceed to notice more particularly, the phenomena this occurrence presents. That effusion of blood which sometimes follows severe coughing, violent vomiting, or a blow upon the eye, (and which, presenting an intensely red, or as it is more commonly designated, a "bloodshot" appearance, greatly alarms many of those in whom it takes place) is situated in the subconjunctival cellular membrane, bearing a certain analogy to the same effusion when it occurs in the subcutaneous cellular membrane from any accidentally applied violence to the surface of the body, or from any other cause. You know that when a person receives a blow upon the body which is succeeded by what is familiarly termed *a black bruise*, there is an effusion of blood immediately beneath the cutis, for the skin itself will not readily permit an effusion of blood to take place within its texture owing to its compactness and its firmness, and the same observation applies with certain restrictions to the texture of the conjunctiva. The effusion of blood into the true texture of the conjunctiva occurs only in extremely rare instances, whilst sanguineous effusion into the tissue beneath very commonly results from accidental violence, or from any cause greatly and sud-

* Chemosis is often confounded with ecchymosis by authors. The learned Sauvages has committed this error; he says, "ophthalmia chemosis oritur à principio externo, ut gravi oculi contusione, unde hyposphagma, vel ab operatione chirurgicâ in oculo institutâ, ut ab extractione cataractæ, operatione unguis, empiesis, &c." Tom. II. p. 65. Even Mr. Cooper, one of the most learned and accurate surgical writers of the present day, has fallen into the same mistake and speaks of chemosis as consisting of "a quantity of blood, infused into the cellular membrane, which connects the conjunctiva with the anterior hemisphere of the eye." *A Dictionary of Practical Surgery* p. 333.

denly distending the conjunctival and subconjunctival blood-vessels. You will however notice some difference between subconjunctival ecchymosis occurring as the result of a blow, and that succeeding to any violent straining effort, such as vomiting, coughing, or severe bodily exertion, for, in the former instance, the effusion of blood occurs in the actual site of the injury, but in the latter case it takes place, with scarcely any exception, immediately around the margin of the cornea, spreading from thence towards the periphery of the globe; but it will be remarked that the margin of the cornea is occupied by a deep-red effusion extending for some distance along it, whilst the effusion is less extensive and dense and much paler as it recedes from thence, until it is gradually lost in the natural aspect of surrounding parts. I am not prepared to say that this kind of effusion is never productive of serious mischief, but such an event must be of extremely rare occurrence—that is, the production of much serious irritation or inflammation of the eye, from the *mere existence* of subconjunctival ecchymosis.*

* Subconjunctival ecchymosis has sometimes occurred under my own observation, quite unconnected with local injury, in persons of a full habit of body, and in such instances I invariably recommend immediate blood-letting. I feel assured that by giving this advice, in a manner which has impressed persons with my decided conviction of its importance to their safety, I have rescued many of them from the risk of apoplectic attacks. I have known sanguineous apoplexy or other serious effusions of blood follow the occurrence of subconjunctival ecchymosis, where inattention to this indication of the undue plenitude of the system, or of the congested state, or condition of vascular fulness of the head, has occurred: on this account I am not prepared to accede to the earlier part of the following statement by Wenzel. "La conjonctive est assez sujette à éprouver cet espèce d'accident (ecchymosis), qui n'a d'ailleurs rien de dangereux. Souvent cet épanchement, causé par la rupture des vaisseaux sanguins de cette tunique, *a lieu pendant la nuit*, [I apprehend there is a peculiar meaning attached to this phrase which the author has omitted to express.] sans que le malade s'en doute, et alors la conjonctive paraît très-rouge et comme enflammée; la personne qui en est affectée

I have said that subconjunctival ecchymosis occurs in greatest abundance around the margin of the cornea when produced by vomiting, coughing, or severe bodily exertion, in contradistinction to the situation of the same description of effusion arising from a blow, and you will at once perceive the cause of this peculiarity. During violent coughing or vomiting the blood is driven with great force through the vessels of the eye, whilst its return is much interfered with (as may be ascertained by the florid appearance that organ assumes under such circumstances,) and in passing along that part of its vessels situated in the cellular membrane beneath the conjunctiva, it meets with no impediment until it arrives at the margin of the cornea, where it becomes suddenly checked and interrupted in its course. The effect of this sudden impediment to its progress through these blood-vessels, is first, distention, and secondly, (in some instances only) rupture and the consequent effusion of their contents; the effused blood then assuming the arrangement, and occupying the situation, we have previously mentioned. It is not indeed a mere interruption to the velocity of its progress to which attention is now directed as constituting one part of the causes of rupture, but the occurrence of that sudden interruption combined with an increased impetus of the circulating fluid acting on an already overdistended tube.

n'eprouve aucune douleur, et ressent seulement une pesanteur, et un embarras, comme si elle avait une ordure sous la paupière. *Dictionnaire ophthalmologique.* T. 1. p. 248. "In some cases" (says Mr. Mackenzie when speaking of subconjunctival ecchymosis) "no evident cause appears why the vessels should have opened, for the patient on awaking in the morning finds the conjunctiva of a deep red colour, without any pain being present, or any thing having happened (had the author made those enquiries which were calculated to elicit due information upon this point?) likely to produce such an effect." (p. 195.)

As soon as the effused blood begins to disappear, its edges are perceived to become yellow, the denser-coloured part of the effusion becomes less deeply red, and in a few days the eye assumes a mottled appearance, owing to the irregular manner in which the absorbent process proceeds. The pale and dirty yellow appearance of the eye marks the condition of parts immediately before the entire removal of the disease. In short, to use the words of WENZEL, a few days after the formation of the disease, if proper treatment be adopted, "la conjonctive prend une légère teinte jaune, qui se dissipe peu de tems après." (249.)

Treatment.—The treatment of this form of injury consists first, in the adoption of precautionary measures with a view of preventing the occurrence of inflammation; secondly, the employment of treatment for the removal of any inflammation which may have occurred; and thirdly, in the use of remedies for the purpose of assisting the natural efforts in removing the effused blood. With regard to the first and second divisions of my treatment, I must refer you to my opinions upon these subjects contained in my remarks on acute ophthalmia; the third division will require a little additional consideration. The natural powers of the absorbent function in the eye are extremely active, and whenever there exists a necessity for an increase of this activity, that increase very promptly occurs, without the aid of any artificial stimulus. Generally speaking, therefore, there exists no necessity whatever for the employment of any local remedies, for the removal of subconjunctival ecchymosis; but, in very old persons, and feeble individuals, in whom the absorbent function is less active than in early and adult life connected with a state of perfect and vigorous health, and also in young ladies who regard the continuance of this red condition of the eye with extreme impatience, and lastly, in those cases

in which this effusion takes place in very large quantity, it may be advisable to prescribe a weak spirit lotion, or recommend the use of the common nitrate of silver drops, or zinc wash, for the purpose of increasing the activity of absorption, and quickening the removal of the defect which this effusion constitutes.

It will be understood that the cause of the effusion must always be ascertained as far as possible, and if it be found to indicate, or in any way depend on, an undue plenitude of the system proper depletive measures must be adopted without delay; and, in fact, whether this pathological condition of the eye arise from local injury, from acute ophthalmia, or with whatever affection of the eye or other part of the body it may be combined, the treatment adopted will *not* be solely instituted for the removal of the effused blood.

When the ecchymosis exists to a great extent it has been recommended to open the conjunctiva and evacuate the effused fluid, but it will be remembered that the coagulating part of the blood separates from its serous portion soon after its effusion, and that the latter is absorbed very readily, and that the benefit of such treatment would therefore, under the most favourable view of the case, be very limited; for the thick part, which it is most desirable to remove, will not pass through the opening in the conjunctiva. The pain and the injury to the conjunctiva are therefore inflicted without any prospect of adequate advantage, while there is a risk of causing the putrescence of the effused blood and extensive abscess in the subconjunctival cellular membrane.

Laceration of the conjunctiva.—Laceration of the conjunctiva resulting from external violence will require a treatment varied in accordance with the extent and complication of the mischief. The conjunctiva alone may be

lacerated, the injury not extending to any other texture, or it may be lacerated and stripped from the part it covered, and finally, it may be torn in conjunction with the infliction of injury upon other parts or textures of the eye-ball. I shall confine my observations to the two former varieties of injury.

If the conjunctiva be merely lacerated without being much detached from its natural connexions, the treatment will be limited to the prevention of inflammation, and its subduction if it occurs—the eye should be kept cool and the lids closed by means of a bandage passed lightly around the head ;* but if, in addition to the laceration of the conjunctiva, that membrane is detached from surrounding parts, it may be necessary to replace it, and in some few instances where the detachment has been very considerable, it may be advisable to bring and retain the divided edges in contact by means of an extremely fine suture passed partially through its substance; and this suture should not be permitted to remain for any great length of time, certainly not more than six hours, in consequence of the irritation it has a tendency to produce, and as it will have caused a sufficient adhesion between the conjunctival surface of the sclerotica and the sclerotic surface of the conjunctiva in that time, its continuance is not imperatively required for any longer period. You would not expect to produce union by the first intention, for, mucous membranes (I allude to the true mucous tissue) do not unite by means of that process, but you

* The following directions of Barbette respecting the management of wounds of the eye, though very incomplete are judicious as far as they extend. "In vulnere oculorum" says he, "ab omni pingue abstinendum: sanus item oculus æque deligationem requirit quam læsus: Collocatio capitis recta sit, et aliquo modo erecta." *Opera Omnia.* Geneva. 1683.

will cause a sufficient degree of adhesion between the sclerotic surface of the conjunctiva and the conjunctival aspect of the sclerotica, to lessen very materially the chasm which would otherwise exist between the severed edges of the conjunctiva, and which, would not be filled up by any substituted texture, equalling in fitness and utility, the original membrane. The other parts of the treatment will be conducted on the same principles as the management of simple laceration of the conjunctiva, and in both instances, slightly stimulating applications, such as the zinc lotion or a weak solution of the nitrate of silver, may be required during the progress of the cure. Should a chasm exist between the divided edges of the conjunctiva, the sclerotica will be covered partly by an effusion and secretion from the vessels of the subconjunctival cellular membrane, which, having undergone those changes which are requisite before it assumes the more permanent character of solid deposition, may, by proper management, be prevented from acquiring any undue magnitude or inequality of surface. I need scarcely remark that you will be careful to prevent the occurrence of symblepharon during the union of the severed conjunctiva.

Foreign bodies situated upon, within, or beneath the conjunctiva—Foreign bodies may be either placed between the folds of the conjunctiva, impacted more or less firmly in its texture, or situated beneath its surface—between its posterior aspect and the exterior surface of the sclerotica.

Situation.—When adherent to the conjunctiva they are generally placed at that part where the conjunctive membrane becomes reflected from the eye-lid to the eye-ball; but sharp angular bodies usually attach themselves to that part with which they first come in contact.

Size.—Of course the size of these foreign bodies is very various, but they are generally not merely small but minute. However, the irritation they excite is not so much dependant on their size as on their composition, the smooth or angular character of their surface, and their situation. When impacted in the reflected fold of the conjunctiva they give rise to a much less degree of irritation than when placed nearer the tarsal margin, because they are not carried over the surface of the eye-ball in the movements of the lids upon that part—they are, in fact, when so situated, pretty much in the condition of an encisted particle.

Nature of the foreign body.—On the present occasion, I am supposing that the intruded substance is capable of producing irritation, merely as a foreign body, and am not referring to the introduction of those particles which exert an injurious influence by any chemical or any similar qualities they may possess.

Mode of examining an eye for the purpose of detecting any foreign substance which may be attached to it.—If a person complain of having "something in the eye" (that is the phrase generally employed) he will probably be prepared to say when he first experienced the uneasiness, in what way the accident happened, and whereabout he suspects the foreign body to be situated. It is of course desirable to examine the eye, and for this purpose the patient should be directed to sit near a good light with the injured organ carefully bound up. The lids should then be separated and the anterior surface of the eye fairly exposed. The patient should be directed to look upwards, then downwards, and afterwards to either side, and if the foreign body is not discovered, the lower lid should be depressed and its mucous surface carefully scrutinized, and if it is not discovered to be placed there,

then the upper lid should be everted by means of a probe passed along the upper margin of the tarsal cartilage, when it will very generally be found situated at the part where the conjunctiva becomes reflected from the eye-lid to the eye-ball.

The necessity for removing foreign bodies impacted in, or driven beneath, the conjunctiva* would appear to be, on a *prima facie* view of the subject, so very apparent, that you may perhaps feel surprised when I recommend you to be very cautious how you interfere under such circumstances, and indeed, not to attempt their removal at all in some instances; but so often have I seen acute inflammation and loss of vision produced by the attempts of medical men to extract, *secundum artem*, substances situated within the texture or beneath the surface of the conjunctiva, that it is quite incumbent on me to suggest great caution, and to warn you against needless and officious interference.

* The treatment suggested by BANISTER is very simple and is explained with his accustomed quaintness. He says, if a foreign body get beneath the lid a fair damsel must remove it with the tip of her tongue. MR. GUTHRIE remarks upon this old-fashioned mode of using that *unruly member*, that the sensation produced "is peculiar but not unpleasant."

"If any Splinter of Wood hurt the Eye, lift up the Eye-lids and take it away with a small *Forceps*, or piece of Rag rolled up and wetted at one end with the Patient's Spittle, or a little Lint, or a bit of a Spunge dipped in *Rose or Plantane Water* at the end of a probe. If it be Dust, fetch it away with a *Collyrium*, or if it be a Scale of Iron, apply the Loadstone." Translation of VAUGUION'S *Complete Body of Chirurgical Operations*. London. 1715. p. 328.

This last method of removing particles of iron, was, I think, first particularly mentioned by FABRICIUS DE HILDANUS and was formerly very generally adopted. SABATIER remarks upon the practice of FABRICIUS, which was very successful in the case quoted in his *Médicine Opératoire*:—"Ce fait, connu de tout le monde, a suggéré à DESHAIS GENDRON l'idee d'attirer les corps legers qui pourraient s'être glissés entre les paupières, et qui sont libres, avec un baton de cire d'Espagne rendu électrique par frottement. Peut-être cependant l'adhérence de ce corps avec la cornée qui est continuellement humectée, serait-elle superieure à la force d'atttraction que la cire d'Espagne pourrait acquérer."

What are the circumstances the existence of which would justify or require the removal of a foreign body impacted within or urged beneath the conjunctiva? Your surgical assistance might be required and would be perfectly warrantable, if called to the case soon after the occurrence of the accident, the foreign substance being distinctly visible, and capable of being extracted quickly by means of only a slight degree of force, without enlarging the opening at which it entered the conjunctiva; or if by its angularity, prominence, or situation, it was exciting a high degree of irritation; or if, after having remained quiescent for a certain period,* it had assumed a capacity to produce irritation and inflammation. In those cases where the foreign body is of large size, it may also be advisable to remove it, whether impacted in the substance or situated beneath the surface of the conjunctiva. Sometimes various substances are driven beneath the conjunctiva so that they cannot be withdrawn without first dividing that membrane, and in such cases it is desirable to wait, (unless the foreign substance be of a very irritating nature, or, of large size, or from any circumstance connected with it, gives rise to great personal

* Wardrop (*Morbid Anatomy.* b. 1 p. 71.) mentions on the authority of Manniske "a curious instance, where a body, which stuck on the conjunctiva covering the white of the eye, gradually advanced to the central part of the cornea." It proved to be the wing-case of a beetle. Guthrie (*Lectures on the Operative Surgery of the Eye.* p. 147.) removed "a small piece of the husk of a grass seed from the sclerotica at the upper edge of the cornea, in the eye of a young medical student, which had been lodged there for sixteen months." In the work of Demours "La figure 3, planche 21, représente la moitie d'une coque de millet dessinée sur l'œil de Madame***." Il y avoit sept mois que ce corps étranger était fixé sur la conjonctive." [The same figure of the same plate represents the attachment of a particle of iron to the superior palpebral conjunctiva at that part of it situated about midway between the tarsal margin and that point of the conjunctive membrane where it becomes reflected upon the eye-ball, which, I have mentioned, is not its usual seat, but where, when so placed, it gives rise to very extreme irritation. This circumstance has been very circumstantially explained by Mr. Guthrie. (p. 146.)

deformity,*) and see what extent of inflammatory mischief they occasion before proceeding to excise them. To conclude—their size, their disposition to excite irritation, and the degree of personal imperfection they produce, in addition to the wishes of friends, may induce you to remove them, and I may further add that an occasion for their removal may be produced under the following circumstances—a foreign body may remain beneath the conjunctiva for a certain period without exciting any important mischief, but from a variety of causes the eye may become irritable, and render the removal of the foreign body necessary.

I shall not now notice the treatment required for the attendant inflammation, as that has been particularly mentioned on a former occasion. If the foreign body it is considered desirable to remove be impacted in the conjunctiva, it may be necessary to enlarge the aperture in that membrane, rather than endanger its laceration by a forcible attempt to dislodge it, but if it can be readily removed without inflicting this additional injury, it should of course be attempted.† But when the substance to be

* The following case is quoted by SABATIER, but its result is not mentioned. "C'est ainsi que SAINT-YVES est parvenu à enlever plusieurs fragmens de baleine extrêmement petits, dont les uns s'étaient glissés au dessous de la conjonctive, et les autres n'étaient pas entièrement couverts par cette membrane. Ces derniers furent ôtés avec la pointe d'une lancette. Les pemiers mirent dans la nécessitié d'ouvrir la conjonctive avec une aiguille à cataracte. Quelques-uns de ces fragmens avaient une ligne et demie de longueur." *Médecine Opératoire.* Tom. 3. p. 3.

† A variety of instruments have been contrived for the purpose of removing foreign bodies from beneath the palpebræ and from various parts of the eye and its appendages, and representations of some of them may be seen in the works of DIONIS, WENZEL, and DEMOURS. BEER has enumerated a great many contrivances for this purpose, but what surgeon is prepared with a stock of instruments adapted, in accordance with the advice of BEER, to the multiform condition of circumstances which is associated with this variable description of

taken away is situated beneath the conjunctiva, it is customary to cut down upon it and attempt its removal with a forceps, but this is not always very easily done, on the contrary, it is too often only accomplished after the infliction of great pain and the production of acute inflammation. You will find that as soon as your incision is completed, the movements of the eye will at once destroy the correspondence between the aperture in the conjunctiva and the surface of the foreign body, and that you have really gained nothing by the incision you have made—the foreign substance being very moveable, together with the subconjunctival cellular membrane, upon which the conjunctiva freely moves. To obviate this inconvenience, I am in the habit of raising that fold of the conjunctiva which includes the foreign body, and cutting it away with a pair of convex-bladed scissors. In this manner you remove not only the foreign body but also a portion of the conjunctiva, and I am willing to admit that it would be

injury as it exist in reference to the different parts of the organ of vision? This celebrated ophthalmologist advises that when a small particle be merely slightly adherent to the superior palpebral conjunctiva, a curved instrument should be passed beneath the lid from the outer towards the inner canthus. This method would appear to be a modification of the plan generally practised by surgeons of by-gone days. "Si on ne peut pas l'avoir par ce moyen (the detachment of foreign bodies adherent to the conjunctiva, by means of free ablution with warm water) on attachera au bout d'un brin de balay un petit morceau d'eponge très-fine qu'on aura trempé dans de l'eau, et ayant un peu élevé la paupiere on en balayera tout le devant du corps de l'œil pour amener sûrement avec cette petite éponge ce qui sera entré dans l'œil sous les paupieres." *Cours d'operations de Chirurgie.* Par M. Dionis. Paris 1750. p. 558. With regard to the removal of foreign bodies from the eye, the distinguished Sabatier thus explains his own mode of procedure. "S'ils en ont peu, on les déplace et on les amene au dehors avec un stylet d'argent boutonné à son extrémité. Une petite bande de papier roulcé sur elle-même et légèrement mouillée, pour la rendre plus souple, et, dans des cas plus difficiles, un morceau d'éponge fine arrêté au bout d'une tige, et humecté avec de l'eau de rose ou de plantain, peuvent avoir le méme effet." *De la Médecine Opératoire.* Tom. 3, p. 2.

desirable to avoid the removal of so large a portion of that membrane, as may be required if you are desirous of making one operation suffice, if it could be effected without endangering the occurrence of a more than counterbalancing amount of injury, but after having tried both these modes of operating pretty extensively, I am disposed to recommend the plan now suggested rather than that more generally employed, and, as far as theory alone is concerned, more simple and uninjurious operation which was first described.

When the foreign body is only slightly adherent to, not impacted in, the conjunctiva, it has been recommended to raise the upper lid and pass a pretty forcible stream of warm water beneath it with a view of promoting its detachment; or to put some slightly irritating substance into the eye to induce profuse lachrymation, so that the foreign body may be washed by this secretion towards the inner canthus; or otherwise to drop into the eye some bland tenacious fluid with a view of entangling the injurious particle, and causing its removal with the fluid in which it floats.* I believe all these manœuvres may be advantageously superseded by the methods previously mentioned.

Injury to the conjunctiva by the application of irritating and escharotic substances.—Various substances possess a power either of exciting great inflammation or of effecting important changes in the texture of

* I introduce two extracts from the works of approved writers on diseases of the eye, of former and recent times, for the purpose of showing that the confidence of some surgeons in the absurd trifling to which I have referred in the text, still exists. "The seed of *Oculus Christi*, when any small mote or grauell is in the eye, then being put in by reason of the muscelagenous or sliminesse of it, the grauell or mote sticketh unto it, and so bringeth it foorth." Banister. *A Treatise, &c.* London. 1622. "Penicillo pinguedine mitiori fluidaque irrigato medicus corpuscula studeat amovere, quæ oculum tali modo irritant." Benedict. *De morbis oculi humani inflammatoriis.* Lipsic. 1811.

the conjunctiva when permitted to touch that membrane; such, for example, as acids and lime, and a great variety of stimulant and escharotic substances. Inflammation merely may be excited by these agents, or they may lead to an immediate change in the texture of the part with which they remain in contact. In all such cases, your first object (if called upon soon after the occurrence of the accident) must be to remove every portion of the stimulating or escharotic substance, either by means of the probe, or, by the *forcible* injection of milk and water upon its surface, and during the progress of the cure the same precautions will be required to prevent or diminish deformity, as were suggested in the course of my observations on the treatment of burns of the conjunctiva; do not let a patient carry about with him so obvious and loathsome a defect as may be sometimes witnessed after neglected or mismanaged accidents of this nature, in consequence of any inattention of yours. The management of the inflammation which may be caused by, or associated with, this description of injury will be conducted according to the principles already laid down.*

When lime in a much diluted state is applied to the conjunctiva it does not actually destroy its texture, but renders it thicker and more vascular than usual, so that the affected portion is more prominent than its neighbouring healthy part. If the conjunctival covering of the cornea be touched with the weakened lime, it undergoes the same change as the sclerotic or palpebral portion under the like circumstances, and this I have known to be mistaken for pterygium. If the texture of the conjunctiva be entirely destroyed, the inflamed cellular membrane

* Demours has the following remarks *De l'ophthalmie, effet des substances âcres.* "J'ai toujours remarque qu'une saignée de la jugulaire répétée s'il est nécessaire, etait préférable à tout autre moyen, et suffisait quelquefois dans les plus graves accidents de ce genre." *Traité des Maladies des Yeux.* Par A. P. Demours. Tom. 1, p. 217.

gives rise to granulations, which are somewhat loose and florid, and these granulations always evince a disposition to be luxuriant and become prominent, which disposition is counteracted by the friction of the eye-lid upon the globe; so that in this state of things we generally find the sclerotica covered with a florid sarcomatous production, which resembles the acute inflammatory chemosis, except that it is less prominent. It is in this state of things—in the ulcerated condition of the palpebral and sclerotic conjunctiva—that adhesion is so likely to occur, unless prevented by moving the parts very frequently, dropping upon the ulcerated surface a solution of the nitrate of silver two or three times a day, and taking care to separate without delay any newly-formed adhesions by means of the flattened extremity of a probe.

SECTION X.—RELAXATION OF THE CONJUNCTIVA.

The connexion of the conjunctiva with the subjacent parts is sometimes so loose and relaxed, as to constitute a very troublesome and unpleasant malady, and this laxity of the conjunctiva may or may not be combined with sub-conjunctival œdema. You will understand that the affection to which I am now adverting, consists of a morbid laxity of connexion between the conjunctiva and sclerotica, so that the former moves so freely and extensively upon the latter as to collect in visible folds in the ordinary movements of the eye, and particularly around the margin of the cornea.

The defect may be so trivial as scarcely to attract notice, or it may be so great as to constitute not only a visible personal imperfection, but even to impede and much interfere with the motions of the eye-ball, and, what is still more important, to render the eye extremely susceptible of inflammatory attacks from very trifling causes.

It rarely occurs in early life unless the individual in whom it takes place has been the subject of acute inflammatory disease of the external tunics of the eye, and particularly when those attacks have been accompanied with chemosis or œdema of the subconjunctival cellular membrane, so that it would appear to be induced by the existence of previous attacks of acute ophthalmia which, by their effects, have much distended the subconjunctival cellular membrane, and to be promoted by that relaxed state of the system which is the necessary concomitant of extreme senectitude.

Treatment.—The treatment of this form of disease may be either constitutional or local, or both combined. The constitutional treatment, in old persons or young persons with enfeebled and shattered constitutions, consists in the administration of tonics and stimulants, so as to remove or relieve that atonic and weakened condition of the system on which the relaxation of the conjunctiva depends, and of which indeed it sometimes forms merely a part. The local remedies most commonly employed are such as are of a stimulating or an astringent nature; the alum collyrium, the zinc lotion, a weak solution of the nitrate of silver or the sulphate of copper, are all of them well adapted to relieve this relaxed condition of the mucous covering of the eye, and may be safely employed for this purpose if the other textures of this organ are not materially inflamed. I can imagine that the relaxed condition of the conjunctiva may proceed so far as to render its partial removal by a surgical operation, necessary, and if such a case should occur, the superabundant portion may be removed with the convex-bladed scissors, and the direction in which it should be excised would be determined by the situation and the extent of that portion of the mucous membrane which was more particularly in a state of relaxation.

SECTION XI.—ŒDEMA OF THE SUBCONJUNCTIVAL CELLULAR MEMBRANE.

This condition of the cellular membrane may or may not be associated with a permanently relaxed state of the conjunctiva, or, an *appearance* of relaxation of the conjunctiva may be merely produced for a temporary season by the interposition of serum between it and the sclerotica. This œdema is of various kinds, and they are chiefly distinguished by the qualities of the effused fluid, which is generally either healthy serum, or serum tinged of a red or deep yellow colour. It is easily known by the watery aspect of the eye, the elevation of the conjunctiva around the margin of the cornea, and the collection of the fluid in a *particular* spot, when the eye is turned in a *certain* direction. It is not productive of any pain or much uneasiness, but like the former disease, it impedes the motions of the eye-ball and establishes a particular susceptibility to various inflammatory affections of the eye, and like it also, most commonly occurs at the middle and latter periods of life. It may exist simply as a local defect, or as symptomatic of general and constitutional derangement. When it remains after acute conjunctivitis it is generally removed by the use of slightly stimulating and astringent applications, but when it exists in connexion with anasarca or constitutional debility or disease of the heart, it becomes remediable chiefly by the same measures as the more important malady may require.

SECTION XII.—SUBCONJUNCTIVAL EMPHYSEMA.

Subconjunctival emphysema sometimes results from fracture of some one or more of the bones connected with,

or entering into the composition of the orbit, and never, as far as my observation extends, arises from the secretion of air from its own vessels. It is not *in itself* very important and rarely requires any medical or surgical treatment. The air speedily becomes absorbed, and if the mode by which it gained admittance be discovered and the admission of a fresh quantity prevented, the cure will very soon be completed. Should it however greatly increase and occasion much inconvenience, it may be easily discharged by puncturing the conjunctiva which covers and confines it. In all such cases it is advisable to request the patient not to blow the nose forcibly lest the powerfully propulsive ingress of air that effort produces should absolutely rupture and detach the cellular connexion of the conjunctiva to the subjacent parts.

SECTION XIII.—SUBCONJUNCTIVAL PHLEGMON.

The subconjunctival cellular membrane, in common with the same tissue in other situations, is liable to circumscribed plegmonous inflammation, which is readily distinguished by its prominent and somewhat acuminated figure and its general appearance. There is at first a slight redness at some particular spot, generally nearer to the periphery of the globe than to the cornea. This redness, arising from the circumscribed phlegmonous inflammation, is usually accompanied with a slight enlargement of some of the conjunctival vessels, by degrees the phlegmon is rendered distinctly evident by nearly all the more prominent characters of superficially seated phlegmon arising in other situations, namely, pain, redness and swelling; finally, it either disappears by the process of resolution or it suppurates, and when this occurs the matter which

is formed should be discharged without delay by a puncture made with a fine pointed lancet. The only other treatment required will be the administration of a little aperient medicine, and the employment of warm fomentations. Slight scarifications with a lancet will sometimes effect its removal without rendering necessary the more tedious and troublesome process of suppuration.

The occurrence of subconjunctival phlegmon is somewhat rare, and I really cannot communicate any certain and precise information respecting the causes whence it proceeds. That it is not in general produced by local injury is proved by the fact, that subconjunctival ecchymosis arising from a blow is not associated with or succeeded by the formation of subconjunctival phlegmon, which would of course be likely to occur if the infliction of local injury were its real and its usual cause. I have already explained, when speaking of erysipelatous inflammation of the conjunctiva, that the subconjunctival cellular membrane is sometimes infiltrated, and that phlyctenulæ are very apt to arise, and I mentioned that in such cases I had never known a distinct phlegmon form, nor those purulent collections take place in this situation which are so apt to occur in the subcutaneous cellular membrane when the skin and the immediately subjacent parts are affected with phlegmonous erysipelas.*

* Wenzel speaks of a sort of carbuncle of the eye which I have never seen, nor have I observed it described in a like manner by any other author, and he gives the following rather startling account of it. "Le charbon de l'œil diffère de celui des paupières, parce qu'attaquant le globe, la sclérotique et les membranes qui lui sont voisines, le danger est plus imminent, relativement à la vision, qui est menacée dans la suite, et en raison des douleurs plus vives. Il diffère encore pour le traitement, au moins dans quelques points. Les mêmes remèdes doivent être employés, et on doit y joindre l'usage du kinkina à l'intérieur, et bannir celui des caustiques. Si le charbon de l'œil

SECTION XIV.—VARIOUS CHANGES WROUGHT IN THE SUBCONJUNCTIVAL CELLULAR MEMBRANE BY INFLAMMATION AND OTHER CAUSES.

The subconjunctival cellular membrane undergoes various changes from inflammation, some only of which have been mentioned. Sometimes its cellular texture is quite obliterated (absorbed), sometimes it is perfectly consolidated, in other instances its connexion with the sclerotica is loosened, or it is infiltrated with serum, or partly filled with inflammatory depositions which are not removed when the inflammation which produced them has ceased to exist. These changes are by no means important, merely interfering with the freedom of motion between the conjunctiva and the sclerotica, but not leading to any change in the *surface* of the conjunctiva requiring medical or surgical aid, or producing any loss of smoothness or equality by which the movements of the lids upon the eye-ball are rendered painful or injurious. The effects of inflammation upon the subconjunctival cellular membrane are as various as those produced by the *same* cause in the *same* texture in other situations, but owing to the very great activity of absorption in this part, they are more generally and more rapidly removed when the inflammation which caused their deposition has subsided.

Foreign bodies sometimes become encisted, when situated in the subconjunctival cellular membrane, and this is the usual mode in which such substances, when placed

augmente, que l'on s'aperçoive que, malgré tous les médicamens les plus convenables, la gangrène se montre, et qu'il n'y ait plus d'espoir de recouvrer la vue, on doit se presser d'extirper l'œil, sans trop attendre, crainte d'exposer la vie du malade." *Dictionnaire Ophthalmologique.*

within the living body, are prevented from exciting irritation. I shall not now enter further upon this subject, but in a future *Section* I shall briefly explain the more important circumstances connected with the development of a cist around foreign bodies, which are situated within any of the textures of the eye-ball.

The organization of various inflammatory products may take place in the subconjunctival cellular membrane just as it does in other parts. I have seen it entirely absorbed (atrophied) by disease as well as by local injury, so that the conjunctiva was adherent to, not moveable upon, the sclerotica. I have observed it also to be much enlarged (hypertrophied) so that, it may be said, an excessive development of cellular tissue had occurred between these two membranes.

CHAPTER III.

DISEASES OF THE CORNEA.

Observations on the structure of the cornea.—The anatomical characters of the proper structure of the cornea are very peculiar, and dissimilar in many essential particulars to those of any other texture entering into the composition of the system. It has indeed been compared to the nails, but it is scarcely requisite to point out the very trifling degree of analogy subsisting between these separate structures. The cornea is composed of a series of lamellæ which move very freely upon each other, and between each of which there exists a minute portion of cellular membrane, connecting them together so loosely, as to permit the great extent of motion to which I have just adverted, and which is rendered evident by grasping the cornea between the thumb and finger, and moving them, by means of slight pressure, in opposite directions.* Its outermost layer is covered by the conjunctiva, which becomes materially modified in its characters when it reaches the margin of the cornea to be extended over its surface, and its innermost layer is covered by the serous membrane which is considered to constitute part of that

* An admirable account of the true lamellar texture of the cornea is given by Leeuwenhoek (*Arcana naturæ detecta*, p. 316,) Zinn (*Descriptio Anatomica Oculi humani*, p. 19,) Clemens (*Scriptores Ophthalmologici Minores.* Vol. 1, p. 108,) and also by Travers (*A Synopsis of the Diseases of the Eye*, p. 19 et 390.)

serous surface which secretes the aqueous humor. The corneal lamellæ themselves, are somewhat firm and compact in their structure, and slightly elastic, and are nourished by colourless vessels; at least in the natural state of parts no red vessels—no vessels circulating red blood—can be detected either upon its surface, in the interlamellar cellular membrane, or within the proper substance of the laminæ, nor can coloured injections be forced into them;* but, under certain states of disease, the cornea becomes so vascular as to resemble, in point of colour, a piece of scarlet cloth, such is the case in the disease termed *pannus*. The cornea is endowed with but a feeble degree of vitality—very few of the animal textures possess a more feeble share of vitality or less sensibility than the proper structure of the cornea in its natural and healthy condition. But like many other textures similarly circumstanced in these respects, it is covered by delicate membranes which are endowed with all the qualities comprising a high degree of organization and sensibility. Thus then, there enter into the composition of the cornea;—first, its outer mucous covering;†—secondly, its proper laminar structure;

* Dr. Prout appears to think (*London Medical and Physical Journal*. Vol. 30, p. 94,) that he has injected the vessels of the cornea, and he says "the most vascular parts of the cornea seem to lie immediately under the membranes which cover its two surfaces, whilst its central part is apparently much less furnished with vessels." See also upon this subject *Traité des Maladies des Yeux; contenant la traduction de l'ouvrage de* Samuel Thomas Soemmerring, *intitulé:* "*Icone Oculi humani.*" Par. A. P. Demours. Paris, 1818. Tome iv. p. 72.

† The part of the conjunctiva which covers the primitive layer of the cornea, and constitutes its mucous surface, does not posses *all* the characters of mucous membrane in general, nor are those of the characters of true mucous tissue which it does possess, exhibited and developed in a perfect and distinct manner, so that, like the part it covers, it may, with propriety, be classed among the anomalous textures. For further information respecting the *anterior membrane of the cornea*, the reader may advantageously consult the following

—thirdly, the cellular membrane connecting together its lamellæ;—and fourthly, its serous lining. It will be obvious from this exposition of the several textures composing the cornea, that its diseases will be evinced by very varied symptoms, for, at their onset, they will always possess those general characters, which, under such circumstances, are peculiar to that texture, wherever situated, in which the affection resides, but, from the circumstance of proximity, the original distinctions of character are occasionally lost by the extension of disease to every, or almost every texture entering into the composition of the cornea.

I should have stated that although the lamellar texture of the cornea is by no means a highly sensitive part, yet it possesses nerves, which, according to Professor Schlemm of Berlin, proceed from the superficial branches of the ciliary nerves.

SECTION I.—SIMPLE ACUTE INFLAMMATION OF THE CORNEA.

Inflammation of the cornea occurs at all ages, and is not confined to any particular kind of constitution (although, as will be presently noticed, it most commonly takes place in strumous children), it is generally tedious

works:--*Descriptio oculi humani iconibus illustrata; auctore* J. Gottfried Zinn. Gottingen, 1755. p. 24.—*Traité d'anatomie descriptive*, par Xav: Bichat. Paris, 1802. Tom. 2, p. 425.—Clemens in *Scriptores Ophthalmologici Minores.* Lipsic, 1826. Vol. 1, p. 105.—*Traité Pratique des Maladies des Yeux.* Traduit De L'Italien d'Ant. Scarpa. par J. B. F. Léveillé. Paris, 1807. Tom. 1, p. 343. et seq.—*The Morbid Anatomy of the Human Eye*, by James Wardrop. London, 1808. Vol. 1, p. 3.—*The Anatomy and Physiology of the Human Body*, by John and Charles Bell. London, 1823. Vol. 3, p. 31.—*The Anatomy of the Human Eye*, by John Dalrymple. London, 1834, p. 268.—I have also published some observations upon the subject in the fifteenth volume of the *London Medical Gazette.*

in duration and frequently leaves behind various effects which tend to impair vision in a more or less serious degree. The best examples of acute corneitis are those produced by the prolonged impaction of a particle of metal or some small foreign body in its substance, for, in such instances, the malady is severe and distinct, and all its characters are exceedingly well-marked and very fully developed.

Characters of corneitis.—At first there is a slight degree of intolerantia lucis, cloudiness of the cornea, and a tendency to an arrangement of vessels around its margin; as the disease advances, these symptoms are increased, the intolerance of light becomes very much greater than before, the vascularity of the sclerotica is also much more considerable, and there is a distinct vascular zone around and sometimes even encroaching upon the corneal margin;* the dull and cloudy state of the cornea is now so considerable that the iris can scarcely be discovered,—it is indeed almost entirely obscured,—and there is oftentimes an intense deep-seated pain in and around the orbit, and also in the head, in addition to an acutely sensitive condition of the supraorbitary nerve. Sometimes the pupil is

* The vascularity of, and around the cornea, which forms so necessary and prominent a character of corneitis, is not alike in all instances. Its colour is, however, always the same, and its peculiar pinkness is well contrasted with the grayish or cloudy-blue appearance of the inflamed membrane. Sometimes there is a mere vascular zone around the margin of the cornea which extends quite to its edge, possesses its greatest depth of colour at that part, and becomes gradually fainter as it recedes from the corneo-sclerotic junction. Sometimes the arrangement of vessels does not form a perfect circle, it is incomplete at some part of it, and is seen as a pretty extensive vascular patch around the corneal termination of the large vessels at the upper, and lower, and lateral parts of the eye-ball, so as to form, on its distal margin, an imperfect arch or festooned arrangement of vessels. In the progress of the malady, when the vascular zone is distinct and complete, vessels may extend upon the margin of the cornea in great numbers, so as to give to the part a pretty uniformly red appearance,

enlarged; in other instances the eye appears prominent as though there existed a superabundant quantity of aqueous humor in its chambers. These symptoms may remain for a certain period, and may exist in various degrees from their slightest to their most severe extent without producing any more permanent and ostensible changes. When a case has proceeded to this extent, it will generally be found, upon a minute inspection with a magnifier, that the surface of the cornea it rough and covered with an infinite number of minute ulcers, and if carefully examined they will appear as small cup-like depressions, presenting a peculiar glazed surface.

Now, although nothing can be more distinct than corneitis when fully developed, that is, when the cornea is extremely cloudy, (the cloudiness has generally a pale dirty bluish-white tinge) the intolerance of light considerable, the zonular arrangement of vessels around the corneal margin distinctly visible, and the deep-seated orbital pain, the frontal and circumorbital agony, and the hemicrania present in an extreme degree, yet I have known such cases mistaken and very improperly treated by local stimulants with a view of removing the nebulous state of the cornea, which necessarily exists as one of the most distinctive symptoms of acute inflammation of the cornea, and not merely as one of its effects. Such an error is not likely to occur frequently, where the symptoms are so very distinctly marked as they are in the acute

but when viewed through a magnifier this redness is observed to be produced by a series of separate tubes, which ramify in infinite abundance in the cellular membrane which connects together the superficial corneal lamellæ. I have seen this peculiar redness occupy the whole margin of the cornea and extend for some distance upon its surface, and in other instances it has existed at particular parts of its circumference only, or in other parts of its surface; and again, the vessels may be so few, that their ramifications may be readily traced with the naked eye.

form of corneitis, but, in its chronic form, it is very likely to happen if you do not institute a very careful examination, and are not well acquainted with the diagnostic signs of these two conditions of disease.

I have stated that the dulness or pale bluish-white cloudiness of the cornea is rather a conspicuous symptom of the disease, and it appears to arise from a combination of causes, such as, 1, lymphatic deposition between the layers of the cornea; 2, the secretion of a turbid fluid from the inflamed interlamellar cellular membrane of the cornea; 3, the dull state of the aqueous humor; and, (perhaps) also from the tense state of the anterior portion of the globe of the eye.

The uninterrupted progression of the disease may lead to various effects. The cornea may remain opaque, or it may ulcerate or slough; lymph may be deposited between its lamellæ, or an abscess may form there, which may either burst externally or internally; the cornea may become staphylomatous, or, dropsy of the aqueous humor may be induced. Although lymph may be effused between the corneal lamellæ at almost *any* part of the cornea, it is *usually* deposited at its lower part, in a somewhat crescentic form, constituting the disease termed onyx. If the abscess of the cornea bursts externally, or if the deposited matter ruptures its external layers, it leaves behind an ulcer which, if not very extensive, readily heals by the adoption of appropriate treatment; but, if it be very large it may occasion staphyloma, and if very deep it may cause the evacuation of the aqueous humor, with prolapse, and probably adhesion of the iris; and if internally, it will lead to what is termed hypopium.

Such are the occasional results of acute inflammation of the cornea, but, as I have previously stated, instead of leading to such results it frequently passes into a chronic

form, in which state it remains for many months, eventually disappearing, where the case terminates favourably, in a very gradual manner, until the perfect translucency and natural convexity of the cornea is restored.

I have described the symptoms of corneitis as they exist when the whole of the true lamellar texture of the cornea is affected; but corneitis may be partial—it may exist only in a limited portion of the cornea, and, in such case, the symptoms of the inflammatory affection will exist in, and correspond with, the precise limits and locality of the disease, that is, the sclerotic redness, the slight vascularity and opacity of the corneal texture, &c. will only exist at, and near, that part of the cornea which is inflamed.

Treatment.—The treatment of the earliest stage of acute corneitis will consist in, 1.—Active depletion, the precise extent of which will be regulated by the severity of the symptoms. If the sense of tension of the globe and pain in the head be considerable, and the sclerotic redness very great, it will be desirable to bleed as freely as the patient's strength will permit, to prevent the occurrence of destructive or irremediable changes in the corneal texture.

2.—Purgatives will also be proper at the commencement, prior to the administration of mercury.

3.—Mercury given to the production of salivation is a most effectual means of arresting inflammation of the cornea, and requires to be given, even after ptyalism is induced, in doses capable of maintaining the mercurial influence, until the transparency of that texture is nearly restored; for, if you discontinue the hydrargyrus prematurely, you will be obliged to reimpress the constitution with the mercurial influence, and thus delay recovery, lengthen the treatment, and employ an unnecessarily large quantity of that medicine to accomplish the cure. It will be understood that I am presuming the cloudy state of

the cornea to depend on a certain degree of inflammation which is actually present, and not referring to any cloudiness or opacity produced by inflammatory depositions, which of course, will be more permanent in its duration—and will not be removed immediately on the subsidence of inflammatory action. However, the inflammation may have proceeded so far as to threaten the death of the cornea, and you will know that gangrene of this part may be apprehended by the loss of its polish and equality, and by its dingy yellowish aspect, which may happen to be consecutive to a previous attack of severe uncontrolled corneitis. Under such circumstances, it would not be proper to administer mercury, but on the contrary, it would be advisable to prescribe general stimulants, and if, by their use, its full and complete vitality is restored, it may then be necessary to enter upon a cautiously regulated and a mild plan of mercurial treatment.

4.—In addition to these curative means, it would be advisable to foment the eye with warm water, or to bathe it with goulard lotion, as may be most agreeable to the patient's feelings, and to exclude light wholly or in part, as circumstances may require.

5.—Counter-irritation is also very serviceable, and is generally most useful upon the temples or over the eyebrow. In the acute form of the disease I generally recommend blisters in the one or other of these situations; but, in its more chronic form, where it may be desirable to maintain this effect for a long period, a seton or an issue are preferable; not forgetting, of course, to preface the use of counter-irritation by the abstraction of a due quantity of blood. With treatment such as this, you would regulate the diet and recommend abstinence, in the strict sense of the term, to be rigidly observed.

The acute form of corneitis is very apt to merge into

the chronic form, and, in such cases, indeed in almost every instance of chronic corneitis (not scrofulous,) you should maintain a slight degree of mercurial action, institute some permanent form of counter-irritation, and carefully regulate the diet.

Sometimes inflammation of the cornea leaves behind a slight degree of interstitial deposition, and in such cases you will be particularly careful how you venture on the use of those local stimulating applications which are usually selected for the removal of simple opacity of the cornea;—unless you are quite sure that the cloudiness of the cornea is altogether referable, as an effect, to the inflammation which is just removed, you had better not risk the production of a fresh attack of corneitis by a premature attempt to remove the cloudiness of the cornea by the aid of local stimulants.

It is not necessary to say any thing at this time respecting the treatment of the various effects of inflammation of the cornea, for, they will all of them be more properly considered in connexion with the diseases to which they are more generally and particularly allied, or treated of as distinct and separate affections under some part of the present division of our subject.

SECTION II.—STRUMOUS INFLAMMATION OF THE CORNEA.

Although strumous inflammation of the cornea is very similar in its general aspect to common inflammation of that texture, there are a few circumstances requiring more particular notice in the history of the disease and its mode of treatment. In the first place it will be remarked that it occurs in scrofulous persons (almost always before adult age), and that it is more generally an extension of

inflammatory mischief from other parts, than a primitive inflammation of that particular texture. Scrofulous conjunctivitis and scrofulous iritis very often extend and implicate the cornea in the same inflammatory mischief if permitted to continue for any considerable length of time. This occurrence is exactly what you would be led to expect, *a priori*, from a knowledge of the anatomical structure of the cornea, which possesses no qualities which render it specially obnoxious to strumous inflammation.

In order to condense my observations as much as possible, I may state, that strumous corneitis differs from common inflammation of the cornea in the following particulars. 1.—The subject of the former disease exhibits, in a more or less distinctly marked degree, a scrofulous constitution. 2.—The disease is a longer time in fully establishing itself. 3.—It is generally produced by the extension of inflammatory action from other parts, such, for instance, as the conjunctiva and the iris. 4.—It is more tedious in duration. 5.—It is attended with less pain but with a greater degree of photophobia, and generally with a less obvious zonular arrangement of vessels around the margin of the cornea than is common acute corneitis. 6.—The pale, cloudy (not clear) bluish-white appearance of the cornea (the part has a tint very like poor skim-milk*) is more distinct, more pronounced and more general. 7.—The prominent appearance of the cornea is more generally

* The appearance of the cornea I have been solicitous to describe in the text is pretty well, though not quite correctly, represented by Wardrop (Plate 7. Figure 1.) Demours (Plate 25. Figure 2. and Plate 32. Figure 1.) and Travers (Plate 1. Figure 4.) Mr. Lawrence says, the cornea appears like *ground glass*, or as though *minute drops of dew* were upon its surface, but though this morbid appearance is quite familiar to an experienced surgeon, it is difficult to convey in language, or through the medium of engravings, a precisely accurate idea of its characters.

witnessed, and observed in a greater degree—it is as though the cornea was projected forward by an increase of the aqueous humor. 8.—The pink appearance of the sclerotica is more decided, more equally diffused over the surface of the eye, so that the zone at the corneal margin is less definite and distinct than it is in simple corneitis—the peripheral margin of the zone is so gradually shaded off, that it is difficult to say exactly where it terminates.

As far as my observation extends, the preceding distinctions comprehend every important diagnostic sign between common and strumous corneitis.

Treatment.—The treatment of strumous corneitis differs somewhat from that of common inflammation of the cornea. If the inflammation be recent, and if the child in whom it occurs be florid and strong, the application of a few leeches to the lower lid, the administration of mercury to the production of slight ptyalism, and also counter-irritation to the temple or eye-brow will be advisable. It will be also proper to exclude all bright light, to regulate the diet, and to apply some cooling lotion to the inflamed organ. But you will carefully watch the effect of this treatment, for, you cannot calculate upon its utility in these cases with the same degree of certainty as you generally may do in the former instance, and if you have reason to think that the inflammation is not improved and that the system is much debilitated and disturbed by the mercurial influence, you would not hesitate to change your plan of treatment for that which I am about to explain.

When strumous inflammation of the cornea results from an extension of inflammatory mischief from other textures, it often happens that the system is in a shattered and enfeebled condition; sometimes this state of system preceded disease in the eye, sometimes it has been induced by

that disease, but more frequently, by the medicines employed for its cure. Again, strumous corneitis sometimes occurs as a primitive disease in a poor debilitated child, whose system is not in a condition to sustain, without suffering material injury, the treatment we have considered it prudent to adopt in other cases where the constitution evinces more integrity and vigour. Now, in such instances, you would not advise depletion, nor would you recommend the administration of mercury, nor an impoverished diet, on the contrary, you would at once prescribe the sulphate of quinine in grain doses taken two or three times daily, with an occasional dose of some laxative medicine, and you would further advise a light nutricious diet, chiefly composed of eggs, milk, arrow-root, broth, and animal jellies; and, what is by no means unimportant, you would secure to your patient, as far at least as an urgent recommendation could secure it, the advantages of country air and exercise—exercise so regulated that it shall leave behind only a very temporary sensation of debility; for, a durable sensation of fatigue after exercise, is almost always an indication that it has been carried too far. Still, however, it would be right to have recourse to counter-irritation, regulated, as regards its situation and the agents by which it is produced, by the rules previously mentioned, but on account of the chronic tendency of this form of the disease, and its tedious duration, I have usually found it necessary to place an issue in the arm, the back of the neck, or the temple. Let me not be understood to assert that the tonic and stimulant part of your treatment must be restricted to the administration of quinine in all such cases, as those to which I am now referring. The mineral acids, the liquor potassæ, and the various preparations of iron and of iodine, have all and each of them been strongly and almost exclusively recommended, and

the trials I have made of them justifies me in saying that they are sometimes very useful, but they are quite inferior to the sulphate of quina as regards their general applicability. I have already explained that M. Lugol recommended the use of iodine in various modes for the cure of certain forms of scrofula, and also for the cure of strumous inflammatory affections of the eye, and that I was at great pains to follow up his recommendation by instituting some careful trials of his plan of treatment just as he had advised. However, I scarcely know to what particular forms of ophthalmic inflammation he refers in his book, for his descriptions of disease are extremely vague and indefinite, but I am quite sure that, speaking generally, you ought not to administer iodine in strumous corneitis occurring under the circumstances we are now presuming to exist, in preference to quinine; but I have spoken of these matters previously, and they who wish to be acquainted with my opinions more in detail, may refer to the third volume of the *Midland Reporter*, and to the tenth volume of the *London Medical Gazette*.

To complete the treatment of strumous corneitis:—in those instances where the skin is harsh and dry, it may be necessary to recommend the use of a warm bath every other evening with a few grains of the pulvis antimonialis or Dover's powder, to be taken at bed time, in order to induce a more healthy condition of the skin—to assist, in short, the operation of the constitutional treatment.

SECTION III.—GANGRENE AND SLOUGHING OF THE CORNEA.

The cornea, like all the other animal textures, is liable to perish from diminished vascular supply, in whatever way that diminution of supply may be induced, and like all

lowly organized structures it is peculiarly exposed to this accident whenever it becomes the seat of acute inflammation. Where gangrene of the cornea results from inflammation, the whole of the corneal layers generally perish, but when it is caused by lime or any caustic or escharotic substance, the process of gangrene is more frequently limited to its surface, and the dead portion is thrown off in the same way as a slough is detached and separated from the surface of a common ulcer. Now when that process is arrested by means of which merely a limited portion of the cornea is destroyed, the absorbents of the cornea form a groove *around* the slough, whilst those on its *posterior* surface remove in the same way that part of the living cornea which is in immediate contact with the dead portion; the adhesion or connexion between the dead and living parts being thus gradually destroyed by the agency of the absorbents, the slough will either spontaneously fall from its seat, or it may be most readily removed by the forceps; the part upon which it was situated then constitutes a mere ulcer which is filled up and healed in the same way as ulceration arising from any other cause. When a superficial and circumscribed slough of the cornea becomes detached, it is advisable to syringe the part whence it was removed with warm water in order to ascertain its precise condition, for, it will sometimes happen that on the detachment of a superficial slough there remains a disposition to sloughing, which disposition is evinced by the appearance of the surface, and in this way, layer after layer is thrown off, until the whole or a great part of the cornea is destroyed. By adopting the plan I have just recommended, you will be enabled to ascertain the exact state of the cornea, and to adapt your remedies accordingly.

Old persons are sometimes affected with gangrene of the

cornea from a very slight degree of inflammation of that part, and, in some instances, without being preceded by any inflammation whatever. Mr. Saunders believed that this description of gangrene bore some sort of analogy to the mortification of the toes in old persons. It seems indeed that the want of a due vascular supply is the true cause of this occurrence (spontaneous gangrene of the cornea) inasmuch as it always takes place in old and feeble persons. We know very well that the circulation is most languid at the extremities, in those parts most distant from the propelling influence of the heart, and we cannot therefore be much surprised that a part naturally low in its grade of organization, whose vessels even in a state of health are of the most minute description, should sometimes perish merely from a gradual *obliteration* of its nutrient tubes, or from an incapacity on the part of the immediately preceding series of blood vessels, to urge a sufficient quantity of the vital fluid into the vessels destined to receive it, for the purpose of nourishing and supporting the texture in which they exist.

When the cornea is extensively divided it is liable to slough, and this effect is more likely to take place in old and feeble persons, so that after the section of the cornea or the extraction of cataract, vision is sometimes destroyed from the lost vitality of the divided tunic. This fact is so well known that many excellent writers on the cure of cataract, point out, as an objection to the extensive division of the cornea, its liability to slough.*

Certain diseases of the brain, and sometimes operations—extensive and severe operations particularly—performed

* Maunoir's very interesting opinions upon this subject may be found in the fourth volume of the *Edinburgh Medical and Surgical Journal*.

about the neck and face are attended with, or rather followed by, sloughing of the cornea, and the same result is produced by dividing the fifth pair of nerves,* and it is a curious and interesting point of pathology to investigate the relation of cause and effect subsisting between the death of the cornea and the injury or disease to which I have just adverted. The change in the vital condition of the part is, however, distinctly owing to the interruption of its nervous and vascular supply.

The evidences of gangrene of the cornea are, a loss or diminution of its natural polish, transparency and equality, and a change in its colour. It is no longer clear and bright, but dull and cloudy, and it acquires a dingy, yellowish aspect, which increases until it becomes thoroughly opaque. The indications of incipient gangrene are, I repeat, a loss of polish, a diminution of transparency, and the acquisition of a dingy yellowish tinge; the evidences of its death are, complete opacity, with a shrivelled, dirty yellowish appearance.

Treatment.—The treatment of gangrene of the cornea will be much modified by the extent to which the indications of the gangrenous action are rendered evident. We are not now to discuss the propriety of reducing that amount of inflammation, which, if unarrested, is likely to terminate in gangrene, for, we are supposing that gangrene or that condition which borders upon, and is immediately preliminary to, gangrene, is already in existence. The general treatment should consist in the administration of tonics and stimulants, such as quinine or the carbonate of ammonia, combined with a generous diet, and the local treatment will consist in the application of some mild

* See upon this subject the opinions of Magendie in the fourth volume of the *Journal de Physiologie.*

stimulant, such for instance, as the diluted vinum opii, a solution of the nitrate of silver or of the sulphate of zinc. If by a fortunate concurrence of circumstances you should be enabled to arrest the progress of gangrene if it has already commenced, or to prevent its occurrence, by prompt and judicious treatment, when that event appeared to be inevitable, you will have to contend, in the former case, with a large and extensive ulcer; and, in the latter instance, with a degree of opacity which will require for its removal great perseverance in the use of the means we shall presently point out. Chemosis sometimes induces gangrene of the cornea, and when speaking of chemosis, in the course of my remarks on gonorrhœal ophthalmia, I represented the great importance of scarifying the chemosed surface, and employing all proper available means of lessening without delay the conjunctival tumefaction, on account of its injurious influence upon the cornea, and particularly upon its external layers.

SECTION IV.—OPACITY OF THE CORNEA.

This term is applied to all those conditions of the cornea in which its transparency is wholly or partially destroyed, without having undergone any material change of figure. But the particular seat of the various kinds of opacity to which the cornea is liable, their colour, their extent, their density, and, it may be added, the cause producing them, have been considered of sufficient importance to justify the application of particular names; thus, when the opacity though somewhat extensive is so slight as merely to impede—slightly interrupt—the transmission of light, the cornea is said to be *nebulous;* when the opacity is distinctly circumscribed, small, and circular or linear, it is termed, *macula;*

when the opacity is dense, of a pearly-white appearance, and leads to the consolidation of the corneal layers, it is termed, *albugo;* and when the opacity results from ulceration and consequent loss of substance of the cornea, it is called, *leucoma.* These names are not indeed very important, but there is at least some *convenience* in adopting this arrangement.* Thus, then, opacity of the cornea comprehends disease differing in its effects upon vision, from the production of little or no impediment, to the total loss of that sense.

Opacity of the cornea is generally caused by inflammation, sometimes results from ulceration or from deficient nutrition, and occasionally proceeds from some change in its texture produced by the contact of lime or some caustic or escharotic substance.

The *seat* of this description of opacity is very various; it may be owing merely to a change in the conjunctival covering of the cornea, or to deposition *between* it and its primitive layer; or, it may depend on some alteration in the proper lamellar texture of the cornea, or it may be referable to deposition in the interlamellar structure, or to deposition within and upon its serous lining.

Again, where the proper corneal substance has been destroyed, a new opaque membrane may be formed to supply its place, and on this account, all extensive ulcers of the cornea attended with the loss of a large portion of its proper laminar structure, are succeeded by a greater or lesser extent of permanent opacity.

* The varieties of opacity of the cornea are well described by Ettmuller (*Opera Omnia Theoretica et Practica,* page 370.), Bidloo (*Opera Omnia Anatomico-chirurgica,* p. 194), and many of the older writers; and they are arranged either from their external characters, or from their seat, that is, whether they are placed superficially or deeply. Their treatment of the disease was, however, for the most part, extremely coarse and injudiciously irritating.

The form of corneal opacities is various, but they are not unfrequently annular or somewhat circular or linear. And then, as regards their extent—they may occupy the whole, or only a small portion of the superficies of the cornea, they may extend through its entire layers, or may be limited to its external, middle, or internal portions.

The general colour of opacity of the cornea, is, a bluish or grayish white, but there are great variations in this respect; sometimes they are of a dense pearly-white appearance similar to the interior of an oyster-shell, occasionally they possess a yellowish hue, and I have observed them to be in several instances, as red as a clot of blood or a mass of fibrine, and I have also seen them of a black colour. Of course, the *quantity* of opaque matter will somewhat modify the intensity of the colour.

Nebula of the Cornea.—Nebula of the cornea is a thin diffused cloudiness which does not absolutely prevent, but merely impedes—slightly interrupts—the transmission of light. This nebula is generally superficially situated, and does not possess a regular and a distinctly marked outline, but is diffused and gradually lost in the immediately surrounding structure. It is this kind of opacity which gives to the cornea a smoky or cloudy appearance. This condition is very often connected with the existence of various kinds of ophthalmia, and not unfrequently disappears, on the subsidence of the inflammation which produced it, without the use of any remedies whatever. The common seat of this opacity is the conjunctival covering of the cornea, or its primitive layer, and it would seem in some instances to be nothing more than the effusion of serum, from the corneal vessels, which becomes slightly turbid by residence. It is not right, however, to limit this kind of opacity to this particular situation, for, it will be sometimes noticed more deeply situated, the

external layers of the cornea being perfectly clear; for, when the cornea is merely nebulous, we can generally ascertain the site of the dulness by looking at the eye in a lateral direction.

Albugo.—Albugo is a dense opacity of the cornea generally affecting its laminar structure and very commonly consolidating its layers, so that when you examine the state of the cornea after death in these instances, you cannot move its layers upon each other as in the healthy state of this structure; they are indeed firmly united to each other, and the corneal lamellæ are found to be more or less opaque. However, this is not always the case, and the term albugo applies to any considerable amount of opacity of a dense character, whether it be owing to lymphatic deposition between the corneal lamellæ, to an opaque change in the proper structure of the cornea, or to complete opacity of its mucous covering and superficial layer.

Leucoma.—Leucoma is a dense opacity of the cornea resulting from ulceration and is not unfrequently connected with synechia anterior. If an ulcer of the cornea be situated upon its external surface and be somewhat deep and extensive, the lamellar structure of the cornea is destroyed, and the cavity which is consequently formed is filled up by lymph or by some opaque substance which never acquires that degree of transparency possessed by the original structure the loss of which it is intended to supply. In the same way an abscess within the lamellæ of the cornea may destroy its layers to a greater or a lesser extent, and instead of being reproduced they are in like manner exchanged for a densely opaque deposition.

There may also sometimes be perceived a sanguineous deposition between the lamellæ of the cornea, at least there is a deposition of red solid matter which so nearly

resembles the fibrinous part of the blood, that I am unacquainted with any animal substance to which it bears so close a resemblance; and it not uncommonly leads to ulceration and gangrene of the cornea.

Before I proceed to the treatment of opacity of the cornea, I will just mention that many of these opacities will be removed by the efforts of nature alone, and that it will not be prudent to risk the production of inflammation by the employment of stimulating drops in every instance, more especially in those cases where the eye is rendered irritable and susceptible of inflammation, from very slight causes, by previous disease.

Some writers have attempted to explain the mode in which the cornea increases in magnitude from infancy to manhood by the change of situation effected in an opacity of its texture, which opacity existed in early life; but even this very simple fact, (which the observation of every medical inquirer will enable him to ascertain) has been differently represented, for, whilst Demours relates the case of a child in whom an opacity of the cornea situated nearly at its margin, in early life, gradually approached the centre of that tunic, for the purpose of proving that the cornea grows only from its circumference, Mr. Travers mentions (what perhaps is scarcely more correct th ougha fallacy of a different description) that a central opacity of the cornea in a child, becomes placed nearly at its margin in the adult. Undoubtedly, neither of the opinions founded on these statements are strictly correct, for, with due allowance for the diminution of size effected by the slow operation and the partial agency of absorption where the natural efforts have not been assisted by artificial means, an opacity formed at the centre of the cornea retains pretty nearly its relative situation with regard to the entire cornea under all the circumstances of growth,

and, if it does not maintain the same relation with respect to the pupil it is merely because that aperture has been drawn aside, for the purpose, as it were, of avoiding the opacity of the cornea which partly or wholly concealed it. The pupil may, in the course of time, change its situation with respect to an opacity of the cornea, but an opacity of the cornea neither changes, in any material degree, its situation with respect to the pupil, if that aperture retain its original situation, nor with regard to the cornea as a whole, whatever increase of magnitude it (the cornea) may eventually acquire. There is indeed conclusive evidence of the fact, that the cornea does increase in every direction at the same time, and that its growth and enlargement do not proceed solely from its circumference nor from any single point alone, of its superficies. However this subject is very fully discussed in the various works on the anatomy and development of the eye, to which I have already alluded.

Treatment.—It is important to distinguish as correctly as possible those opacities of the cornea which are likely to be removed by the unaided efforts of nature from those which invariably require for their removal, the assistance of art;* it is also necessary to ascertain the appropriate season for commencing the use of remedies, for, if there be any external ophthalmia, an irritable condition of the eye or of the general health, or, if the opacity be dependent on a chronic form of corneitis, it would be

* A case is related in the *Lancet*, for October, 1831, in which a very extensive opacity of nearly the whole of the cornea was removed by the unaided efforts of nature, and similar instances of the unexpected restoration of vision may be found recorded in various *Medical Journals*, but I cannot help suspecting that in many of these cases the want of transparency on the part of the cornea has been owing to inflammation of that membrane, and that the return of translucency has been occasioned by the mere subsidence of the corneitis.

unadvisable to apply local stimulants, until these affections are relieved or removed. Again, opacities may exist which the natural efforts of the absorbents are inadequate to remove, but which, on account of their situation, do not present a sufficient obstacle to vision to render their removal a point of much importance on that ground, but as they may constitute an important personal defect in the opinion of their proprietor, we may still be called upon to assist in removing them.

In all cases where the eye is very susceptible of irritation (as former experience may have rendered evident), it would be proper to employ occasional counter-irritation during the continuance of any stimulant plan of treatment for the removal of the opacity, and also to apply a few leeches in the neighbourhood of the eye occasionally; and in every case where you are particularly desirous of completing their removal very quickly, it would be advisable to excite and maintain slight ptyalism.

Simple nebula of the cornea is easily removed by the application of the oxymuriate drops in the proportion of two grains to the ounce of water,* or by the nitrate of

* The following brief extract from the work of Dr. Turner is by no means uninteresting. "Platerus observes an odd Accident happening in his Time by the Surgeon's Mistake, having sprinkled the fine Powder of Sugar-candy upon the cornea of a Child's Eye, in order to remove the Speck thereon, intercepting the Light in a great Measure, inadvertently at one Time took out of the wrong Box the Powder of Sublimate, whence immediately ensued so great Fluxion and Inflammation, as endangered the whole Eye; but strait endeavouring to rectify his Error, and take off the Disturbance, the Patient, as it happened, was so far from being injured, that the Cicatrix being hereby deterged, the Sight was again restored, by Removal of the said Speck; an argument, saith he, that *the Globe of the Eye, or its Coats, are able to bear strong Applications;* but none I think to encourage so dangerous an Experiment." *The Art of Surgery.* Vol. 1, p. 417. The opinion respecting the capacity of the eye "to bear strong applications" has been recently revived by Mr. Guthrie, who, it will be remembered, thanks his Creator, with becoming piety for "rendering the eye-ball nearly insensible." (Preface to the first Edition of his *Lectures on the*

silver drops in the proportion of three grains to the ounce of water, or the daily application of the common nitrated ointment weakened by the addition of two parts of spermaceti ointment; but the denser opacity, termed albugo, will require a more elaborate method of treatment; and, as the eye becomes accustomed to any particular stimulant after it has been used for a certain period, and as its effect is consequently much diminished, it is desirable to vary the stimulating remedy occasionally. On this account I recommend my patients to instil upon the opacity every night at bed time, the nitrate of silver drops during one week, the oxymuriate drops another week, and the vinum opii a third &c., and, by the adoption of this method I secure to them the unimpaired efficacy of each.

As these various stimulants do not produce an equal effect in all cases, it is desirable to ascertain as early as possible what is the precise strength capable of being employed without exciting inflammation, and it is also equally important to watch their early use most carefully,

Operative Surgery of the Eye.) On the other hand, BANISTER, when referring to the attempt of surgeons to cure opacity of the cornea by the frequent use of powerful stimulants, advises all patients to "beware of hasty healers, who may well be called hasty hurters: for tender parts must be tenderly dealt withall, and that is safe dealing."

In the second volume of the *Medical Observations and Inquiries*, (page 232.) there is a curious "Letter from BARON VAN SWIETEN to DR. J. SILVESTER, F.R.S. on the use of the Corrosive Sublimate, in the cure of Opacity of the Eyes." In the course of his communication he observes "contigit datum fuisse illud remedium (corrosive sublimate) homini Luc Venerea laboranti, cui simul cornea oculi alba et opaca erat per plures jam annos, una cum luis symptomatibus evanescebat corneæ opacitas, et omnino pellucida facta fuit. Hoc successu incitatus nobilem juvenem post male curatam ophthalmiam cæcum omnino simili tractavi modo: cornea utraque opaca penitus erat et dum fausto successu in utroque oculo redibat corneæ major pelluciditas, vidi evidenter, *et utramque lentem crystallinam opaciorem esse:* perrexi tamen, sed diu, per 18 menses nempe, et cum eventu felicissimo."

and to weaken them or use them less frequently* if they excite much irritation. By management of this description you will avoid the risk of inflicting serious injury, and at the same time shorten the duration of treatment as much as is compatible with the extent of the disease, and secure to your patient all the advantages which known remedies are capable of affording.

Leucoma of the cornea is the worst form of opacity, and can never be perfectly cured by any remedies, nor indeed much amended when the leucoma results from any great extent of ulceration which has completely changed the texture of the corneal substance; but although that part of it so formed cannot be removed, there is a surrounding portion, constituting a kind of halo around the more dense opacity, which does admit of cure, and which is indeed nothing more than an opaque deposition into the interlamellar structure of the cornea, or, upon its surface, and fortunately it is this portion which from its situation generally presents the chief part of the obstacle to vision. Now, I have nothing to add to the treatment previously recommended, for, as I have before stated, whether the leucoma be combined with synechia anterior or not there will always exist a certain portion of the opacity which does not admit of removal. But there is still one other remedy which is entitled to every attention in these cases, I allude to the strong nitrate of silver ointment. In many instances where dense opacity and leucoma of the cornea have been under treatment for many months, I have effected

* Banister has entered his protest against the too frequent use of stimulating applications for the purpose of removing opacity of the cornea. He says, "some surgeons will dress the eyes with some sharp water of alom, copperisse or such like, three or foure times in a forenoone, that so soone as the sharpnesse of one dressing is past, then beginneth another, and another, as though Rome was built in one day, or a disease in the eye were to be cured in one houre."

very great benefit by the application of this ointment used once a day or every other day in the manner I have formerly advised; indeed without the slightest exaggeration I may state that in those cases in which the application of this ointment can be borne, I have effected as much benefit by a single application of it, as the use of the common stimulating drops has produced in several weeks. The regular application of the nitrate of silver ointment every second day combined with the administration of mercury to the maintenance of a slight degree of ptyalism, with the occasional application of leeches, and also of counter-irritation behind the ears or at the back of the neck, or by means of an issue in the temple, constitute the most expeditious mode of removing albugo and leucoma of the cornea with which we are at present acquainted. Of course, if the use of this ointment excites much ophthalmia its application must be regulated accordingly, for some patients will by no means bear its employment every day, nor indeed every other day.*

* It is the practice at the Hôtel Dieu to employ the insufflation of calomel, and it is said to remove the opacity of the cornea very quickly. This method has been very successful under the management of M. Le Pelletier, and Dupuytren. The distinguished Baron states that "those opacities of the cornea which are recent and slight, are completely dissipated in one or two weeks. Specks of a longer standing, thicker and broader, usually disappear in a month or six weeks; and I have seen some, which occupied nearly the whole cornea and obstructed the entire pupil, completely intercepting the light, disappear entirely in the course of a few months." This mode of curing opacity of the cornea was almost universally adopted by surgeons in former times. The sulphate of cadmium has also been recommended for the removal of opacity of the cornea by Graefe, Rosenbaum, and Tott. I have used it as advised (*Transactions of the Provincial Med. and Surg. Association*, Vol. 3.) by touching the opaque spot with the solution (one grain to two ounces of water) two, three, and even four times a day, and I am prepared to state that the effects of the remedy upon the disease are very manifest, but more slowly manifest than those produced by a solution of the corrosive sublimate.

I should state that the excision of leucoma (when uncombined with synechia anterior) and dense opacity of the cornea, has been strongly recommended by some foreign writer whose name I forget, the separated edges of the cornea being afterwards brought into contact by means of fine sutures; but the plan does not appear to me to be at all judicious and scarcely rational.

Dr. Mead recommends two modes of curing opacity (albugo) of the cornea. He says a little common glass and white sugar-candy should be finely powdered and thus used: "A little of this powder," says the Doctor, "put into the eye with a quill every day, gradually absterges, and wears off the spot by its inciding quality. The other method of removing this speck is, *to order a dexterous surgeon to pare it cautiously every day with a knife;* for this tunicle (the cornea) is composed of several lamellæ one over another, and has thickness enough to bear paring off some of its parts." Such was the miserable state of practice eighty years ago, as explained, with all the pomp of scholarship, by a Court Physician.

In concluding my remarks on opacity of the cornea, I may as well state that nearly four years ago I suggested the use of the hydriodate of potash ointment for its cure. (*Midland Medical and Surgical Reporter*, vol. 2.) I very often use this remedy, and with, certainly, great advantage, and my mode of applying it is precisely the same as for the strong nitrate of silver ointment. It produces less irritation than the oxymuriate drops, but it does not remove the opacity by any means so quickly. However, its use may be advantageously alternated with other stimulating remedies in those cases where a succession and a variation of them are required.

As I do not regard abscess of the cornea which, by bursting internally, constitutes *hypopium;* nor the depo-

sition of a puro-lymphatic fluid between its layers, which forms *onyx;* or of a fibrinous substance which constitutes what I have termed *sanguineous deposition between the lamellæ of the cornea;*—as diseases comprised under what is generally understood by term *opacity of the cornea*, I shall not enter upon their treatment on the present occasion.

SECTION V.—ARCUS SENILIS.

The term arcus senilis is applied to that opaque ring which generally forms a little within the circumference of the cornea in persons at, or beyond, the middle period of life.* Sometimes it appears as early as at the age of forty, but it does not usually appear until after the age of fifty; sometimes it constitutes a very broad circle, in other instances it is merely a fine linear opacity, but never encroaches so far upon the cornea as to interfere with vision. It is generally rather broader at the upper portion of the cornea than at any other part of its circumference. It may exist around only a certain portion of the cornea, or, it may extend and form a complete circle just within the margin of the cornea. It is not attended with any change in the density of the part, and indeed, excepting its opacity and the consolidation of its laminæ,

* Mr. Wardrop appears to think the term *arcus senilis*, as applied to this disease, improper. He remarks that "although it is usually met with in old people, yet I have observed it at all periods of life." *The Morbid Anatomy, &c.* Vol. 1, p. 88. Clemens, who has recently investigated the pathology of the cornea with great minuteness, industry and ability, has not been able to corroborate the novel statement of Mr. Wardrop, in regard to the occurrence of *arcus senilis* (gerontoxon) at an early period of life. He says, "in *seniorum* corporibus cornea, qua cum sclerotica cohæret obscuratur."

it appears to retain every other quality which a healthy portion of cornea is known to possess; for instance, wounds of this part, as in the operation of extraction, heal just as quickly as wounds of any portion of the transparent cornea, but it must be confessed that when it becomes the seat of ulceration, it is by no means so manageable by treatment, as similar disease situated in other parts of the cornea. If it be not a mere alteration effected by age, I am quite unprepared to say what it really is,—no circumstance with which I am acquainted except age seems to be capable of producing it. The change wrought in the arteries, in the cartilages, and other textures, by age, presents the only analogy to the formation of arcus senilis which now occurs to my mind.

Although this alteration in the texture of the cornea is not productive of any inconvenience or injury, and does not lead to any evil consequences whatever, yet as it generally takes place at that period of life when vision becomes defective from other causes, you will frequently be consulted respecting it, on the supposition that it is in reality the cause of the dimness of vision from which the subjects of the affection are suffering; and perhaps you may, in a few instances, deem it prudent to quiet some nervous subjects with a prescription in addition to an assurance that the disease, *per se*, will not occasion any serious injury.

SECTION VI.—ONYX AND ABSCESS OF THE CORNEA.

Onyx.—The term onyx is applied to that lymphatic or puro-lymphatic deposition which sometimes takes place *between* the corneal lamellæ at their lower part, and which presents an appearance somewhat resembling in form and

colour, the white mark at the root of the nails. But it is not my intention to treat of this deposition occurring *only* in the situation to which I have just referred—that is, at the lower part of the cornea; on the contrary, my observations are intended to apply to this description of deposition, at and between whatever part of the corneal lamellæ it may be placed.

Sometimes this deposition will exist only in a very small quantity, but it may also exist in a more considerable degree; this occurrence will depend on the more or less severe degree of the cause or affection which produced it, and on the various circumstances connected with its treatment.*

Now, in a case of onyx, (which in order to render my description as complete and intelligible as I am able, shall be drawn from a well-marked instance of this disease—one in which the characters of the malady are very clearly developed) there will be observed a white tenacious deposition at the lower part of the cornea,† which gradually increases until it arrives on a level with the inferior border

* This affection is pretty well described by Banister more than two centuries ago, as a division or variety of the disease termed "oculus purulentus." He says in the malady called onyx, a slimy matter is collected "betweene the skinnes of the horny membrane," and he then states that the hypopium consists of a larger quantity of corrupt matter which "shineth thorow the horny coat," and he recommends that when it collects in large quantity and occasions great pain, it should be discharged by puncturing the part which covers it with a fine sharp-pointed instrument, and he tells us that he has successfully performed this operation himself, and further, to use his own words, "this practice I have seen performed by Ambrose Pare the Kings Chirurgian; and even most excellently hath he accomplished it, being at the age of three score and twelve yeeres."

† This is its usual situation, for whenever the deposited matter is less consistent than usual, it will, as an effect of gravity, sink to the lowest part of the cornea, and by separating the corneal lamellæ, and destroying the cellular membrane which connects them, produce in different instances a certain risk of causing either very extensive opacity or sloughing of the separated laminæ.

of the pupil, the surrounding cornea being hazy or cloudy (which cloudiness, however, is greatest near to the onyx, and is variable in extent and in degree in different instances) but neither ulcerated nor morbidly projected; at least, I have witnessed many instances in which the disease has proceeded to this extent without projecting the lower part of the cornea, between the lamellæ of which the deposition was placed.* If the deposition continue to increase, the whole cornea becomes affected, its layers separated, and after assuming a prominent appearance externally, it bursts, and generally on its inner surface, discharging the most fluid parts of the deposition into the anterior chamber, and forming one of the varieties of what has been termed *spurious hypopium*. In addition to the hypopium there will be noticed on an attentive examination of the part which has ruptured, a ragged flocculent appearance, partly occasioned by the rent in the attenuated cornea, and partly by the partial detachment of the more solid portion of the contents of the onyx, shreds of which may be seen floating in the aqueous humor, until detached from surrounding parts and blended with the more fluid portion of the morbid secretion situated at the bottom of the anterior chamber.

Sometimes a slight amount of lymphatic deposition takes place between the lamellæ of the cornea in some other situation, and not at its lower part; but, of course, the mere change of situation does not affect the *essential*

* I believe the morbid projection of the cornea or otherwise in the case before us, will be determined by the following circumstance. If the deposition be placed between some of the anterior lamellæ then projection of the cornea, even at an early stage of the existence of onyx may be expected to occur, but, on the contrary, if it be situated between its neural layers, then it is probable that no unusual external bulging of the cornea will take place.

characters of the disease. I have repeatedly witnessed this occurrence after the cornea has been bruised, and I apprehend that lymphatic interlamellar deposition is an exceedingly frequent consequence of contusion of the cornea. The most familiar illustration of this fact which now occurs to me is the state of the cornea consequent on a blow from a wheat ear—a disease which I am frequently witnessing among reapers during the harvest season. The deposition under such circumstances occurs at different parts of the cornea, but is most frequently seen at its centre, on account of its greater liability to be struck at that—its most prominent—part; however the deposition accurately corresponds, as respects its situation, to the particular spot, upon which the blow or injury was inflicted.

I have stated that the deposition in question is either lymph or a somewhat consistent and tenacious substance, which, founding my opinion on its visible and outward characters, I have termed *puro-lymphatic.*

Now, if this deposition take place in considerable quantity it will generally be discharged into the anterior chamber, and, in other instances, externally; in the former case sometimes eventually leading to synechia anterior and closed pupil, and, in the latter instance, to extensive ulcer or staphyloma of the cornea. But it will occasionally happen, and even in the most unpromising instances, that when judicious treatment has been promptly employed, the disease originating the deposition may be arrested, the deposition itself in a great measure absorbed, and adhesion between the separated corneal lamellæ accomplished; but even in this case, there will generally remain, permanently remain, some degree of opacity of the cornea. And this you would be fully prepared to expect; for, when lymph is deposited between the layers of the cornea, those

of its lamellæ which are most proximate to the lymph become first compressed and distended, and afterwards attenuated, and when the disease is arrested, and the process of reparation completed, the new matter which supplies the place of the original lamellar structure of the cornea is not absorbed, for, if it were, staphyloma would be very likely to take place—hence, then, such opacity of the cornea does not altogether admit of removal.

Lymphatic or puro-lymphatic deposition between the lamellæ of the cornea is generally caused by severe inflammation of the connecting cellular membrane of that tunic, by the existence of acute purulent ophthalmia, and other forms of acute ophthalmic inflammation, and sometimes proceeds from small-pox; the primitive and secondary small-pox pustule of the cornea are little else than a lymphatic or puro-lymphatic deposition between the lamellæ of that tunic.

There is an ulcer of the cornea which commences in its centre with absorption of its interlamellar cellular structure, the excavated surface acquiring a secreting property, and, as absorption proceeds, the part removed by the absorbent process, or rather the cavity formed by its removal, is filled up by a secretion from its surface, which is generally of a purulent character; this is the central interstitial ulcer of the cornea, which, at its commencement, resembles lymphatic deposition between its lamellæ unattended with breach of surface, and in its progress may constitute an *abscess of the cornea.*

The onyx more frequently bursts internally than externally, contrary to the general tendency of parts under similar circumstances; so that the disease terminates, when it has pursued a certain course, in that manner which leads to least injury of the functions of the part diseased. The internal ulcer of the cornea formed by the bursting of

an onyx into the chambers of the eye, heals much more rapidly than an ulcer upon the external surface of the cornea, and leads to much less irritation, and is less likely to be followed by staphyloma, inasmuch as the process of reparation commences as soon as the ulcer is formed, whereas, when the onyx bursts externally, the resulting ulcer of the cornea frequently extends, in consequence of the irritation it excites, and to which it is also subject from the injurious influence of the atmospheric air and the friction of the lids upon its surface.

Genuine onyx may be distinguished from an effusion of pus into the anterior chamber, by its seat, its colour, its density, and its tenacity, as detected by the adoption of various modes of examination. If you will examine the eye laterally, you will be able to see behind the deposition when it takes place between the corneal lamellæ, but, in the case of hypopium, you cannot perceive that portion of the iris which is behind it or rather upon which it is placed, and with which it is in immediate contact, in whatever position you may examine the eye. Again, the deposition between the corneal lamellæ termed onyx, is stationary or nearly so, it does not fluctuate or change its figure or situation in obedience to the movements of the body, as may be generally observed in hypopium during any active exertion, any sudden motion, or any deviation from the erect position of the body. The upper border of hypopium is a perfectly even line when the body is in an upright position, but, it is somewhat convex, resembling the upper border of the white mark at the root of the nail, in onyx, when situated at the lower part of the cornea. There are many other diagnostic signs, by which these two affections may be distinguished, but I have mentioned the most important ones.

I have said that a writer (and I might have added

very many others) on diseases of the eye, very accurately distinguished, more than two centuries ago, onyx from hypopium, but you will find that many comparatively modern writers do not entertain equally clear ideas upon the subject; even Mr. Ware appears to confound them, and to consider them merely degrees of the same affection.

Treatment.—The treatment of lymphatic or puro-lymphatic deposition between the corneal lamellæ will in many instances be nothing more than the treatment of the disease producing it; for instance, if it arise in consequence of an attack of acute purulent ophthalmia, the remedies requisite for the prompt subduction of the ophthalmia will generally be sufficient to remove the affection of the cornea—to produce the absorption of its interlamellar deposition. In all cases, then, where the onyx arises from acute inflammation either of the conjunctiva or the cornea, the treatment will be pretty much the same as though the acute inflammation were uncombined with onyx; and it will be perceived that it is often most important to place the system under the mercurial influence with as little delay as possible, with a view not merely of preventing an increase of the interlamellar deposition, but to absorb that which is already present, and to prevent the occurrence of those injurious effects on the structure of the cornea, its continuance has a tendency to produce. However, the deposition may be very considerable, it may have separated the laminæ of the cornea from each other very extensively, the cornea may bulge forward, and be exceedingly prominent; would you, under such circumstances, make an incision into it, at its most prominent part? I believe the experience of surgeons generally is rather adverse to this procedure, but, I have on several occasions been compelled to do so, more however with a view of relieving the pain which the con-

finement of the matter has produced, than from any sanguine expectation of preserving the integrity of the cornea. You may easily perform this operation in the following manner: with a fine iris knife you make a very small superficial puncture at the most prominent spot at the lower part of the cornea, taking especial care that it is not carried so deeply as to pass through the whole of its layers; for, unless this precaution be attended to, staphyloma will be an almost inevitable result. After this small section has been made a little tenacious matter is gradually discharged, and the pain in and around the eye-ball, and also the hemicrania, is relieved. But as staphyloma frequently follows, in those instances even where this operation has been most carefully and judiciously performed, and always where any considerable section of its entire layers has been made under that change, as regards the texture of the cornea, which always accompanies the existence of a large onyx, it is not prudent to recommend it unless for the purpose of relieving the agonizing torture sometimes present, where there exists scarcely any chance of saving the eye by the cautions and patient adoption of other measures. If I were to consult my own experience merely I should say that some very bad and unpromising cases have been cured by the absorbent influence of mercury, but that none have recovered where, with equal chances of a satisfactory termination, the incision of the cornea alone has been made.

After the acute symptoms have been subdued you will derive great advantage from the employment of the strong nitrate of silver ointment. Its use will be advantageously combined with the internal administration of mercury. Used at a proper period, that is, when the acute inflammatory symptoms have subsided, I am unacquainted with any remedy which effects so much benefit in the case

under consideration, in so short a space of time. But I do not wish to limit the local applications to the use of this ointment, for there are many other valuable stimulants, and if you are indisposed to use the unguentum argenti nitratis, or do not deem it applicable to any particular case, you may select either the vinum opii, or a solution of the nitrate of silver, and conclude with the oxymuriate drops, gradually increasing their strength for the purpose of removing the opacity of the cornea after the acute symptoms have subsided, and a great portion of the interlamellar deposition has been removed.

Abscess of the cornea.*—An abscess sometimes forms between the corneal lamellæ which is distinguished from onyx by the little consistence of the deposited matter, an appearance of yielding, indentation and fluctuation, on pressure made with a fine-pointed instrument, and a slight prominence of the most attenuated point of the cornea, that is, if it produce partial absorption of its external layers. I am not acquainted with any part of the treatment of onyx, which is not equally applicable to the management of abscess of the cornea, and may again remark that it is much more advisable to attempt the absorption of the pus by constitutional treatment than by puncturing the layers of the cornea, and discharging the contents of the abscess. A poultice enclosed in a fine

* There is a good account of abscess of the cornea in the work of Chandler (*A Treatise on the Diseases of the Eye and their remedies*, page 144,)—in Mr. Wardrop's *Morbid Anatomy of the Human Eye.* (Vol. 1.)—and also in the first volume of Demours' *Traité Des Maladies des Yeux.* Dr. Rowley (*A Treatise on the Principal Diseases of the Eyes*, page 136,) has also referred to abscess of the cornea, and he says (which appears to have been the practice at the time he wrote his amusing work,) "if the abscess should be small, forming a pellicle, the best method of treatment is, to carefully take off the whole diseased part with a Knife, which may be done at one incision with a steady hand." Zinn (*Descriptio Anatomica, &c.*) adduces abscess of the cornea in proof of its lamellar arrangement.

linen bag and applied to the lids of the affected eye during the night, with the frequent use of herb fomentations during the day, may be advantageously combined with, and added to, the major part of the treatment of onyx.

I may just mention that these abscesses are usually small and distinctly circumscribed, and that they do not often burst internally—they are much more apt to burst externally—and they appear to be owing to inflammation of the cellular membrane which connects together the lamellæ of the cornea.

There is often a good deal of pain connected with the formation of these abscesses, and I have sometimes been obliged to open them, merely to relieve the suffering the confinement of the little matter they contain, has occasioned.

SECTION VII.—EFFUSION OF BLOOD BETWEEN THE LAMELLÆ OF THE CORNEA.*

Blood is sometimes effused between the corneal lamellæ from local injury or similar causes, or it may be secreted during the progress of acute corneitis. The quantity of blood may be very considerable so as to occupy the entire space between two or more of the corneal lamellæ, or it may be small and circumscribed, existing as a mere spot or patch. It may be effused either between its external or internal laminæ, but when in the former situation it is

* "Qui inter lamellas membranæ corneæ oritur tumor duplicis est generis; videlicet, *ab effuso sanguine*, vel extravasata et stagnante lympha." Bidloo. *Opera Omnia Anatomico-chirurgica*, p. 92.

apt to project a portion of the cornea, and to lead to the rupture of the attenuated part.

When blood is effused between the layers of the cornea from local injury it is usually quite fluid, but its serum soon separates and is absorbed, and the fibrine remains for a certain period as an effect of the accident, but when the same matter results from inflammation—as a secretion arising from inflammation—it is deposited in its solid state. If this fibrinous deposition remain, without any measures being employed for its relief, it is apt to become organized and to acquire a degree of vitality which, in a great measure, places it beyond the reach of remedies.

The treatment of the affection is to be guided by the same principles, as those which would regulate the treatment of onyx. Bleeding must be practised with a view of relieving pain and lessening inflammation; mercury must be employed to promote the absorption of the effused or secreted matters, and the other parts of the treatment, such as the occasional use of purgatives, and of collyria, quietude, shading the eyes, keeping in a darkened room, regulating the diet, and so on—must be advised or otherwise as circumstances may require. Should the cornea become very prominent and evince a disposition to slough, from the extensive separation of its lamellæ, and from the existence of the effused matter between its superficial layers, it may be desirable to make a small opening towards the edge of the cornea, and to adopt the treatment we suggested for the relief of gangrene of the cornea.

SECTION VIII.—ULCER OF THE CORNEA.

Mr. Saunders has said that of 6744 patients who had attended at the London Eye Infirmary, 1983 were cases

of ulcer of the cornea; or of pustules of the conjunctiva(?) which usually terminate in ulcers of the cornea.* Now this statement not only determines the vast importance of the subject we are now considering, when we connect with it (ulcer of the cornea) those serious effects on vision which are frequently produced by it, but it also urges us to inquire concerning those circumstances associated with the structure, situation, and functions of the cornea which dispose it to pass so readily into a state of ulceration. The structure of the cornea bears a more direct analogy to that of cartilage than to any other texture, and cartilage very readily passes into a state of ulceration from very slight causes. Absorption of the neighbouring cartilaginous parts from the pressure of an aneurismal sac, and the absorption of the cartilages at the extremities of some of the bones, are events of very common occurrence, and the appearance such parts present when merely absorbed without acquiring a secreting surface is very similar to the progressive absorption, which, without producing a secreting surface, sometimes occurs in the cornea; the cornea, under such circumstances, appears as though a small portion of its substance had been cleanly and carefully scooped away. There is another circumstance to be taken into consideration;—the cornea is not a highly organized part, and in a feeble state of the circulation, and particularly in that condition of the circulation which accompanies extreme senectitude, its vascular supply is very liable to be interrupted and diminished, whilst its absorbent function, like that function in other parts, is very little prone to deviation; the equilibrium subsisting between these functions in a state of health being thus

* *A Treatise on some practical points relating to the Diseases of the Eye*. page 125.

destroyed, loss of the corneal texture is the inevitable result, and that loss will most probably occur towards its central part, where, for obvious reasons, its vascular supply will be most liable to undergo diminution from any cause depressing its circulation generally, and, in such instances, the kind of ulcer I have just pointed out will be most likely to occur; and, in fact, ulcers of this character almost invariably take place at, or near, the centre of the cornea.

But the cornea is liable to ulceration from inflammation of its texture and from inflammation of the surrounding parts as well as from various sources of irritation connected with the eye-lids, and it is also a very frequent concomitant of strumous ophthalmia, and whatever may be the explanation of its occurrence, whether owing to its low grade of organization, a want of the natural correspondence between its secreting and absorbent function, or irritation or inflammation of its proper texture, the fact of its being frequently associated with a disordered or enfeebled condition of the system, is quite unquestionable. Again, it is much exposed from its situation to various forms of local injury, and to irritation from the friction of the lids whenever their palpebral surface is so diseased as to impair or destroy their smoothness and equality. We have an opportunity of well observing the activity of the absorbent function of the cornea in those cases where a particle of metal, or other foreign body is imbedded in its substance; when persons call upon us a few days after having met with such an accident, we may easily perceive the piece of metal, and discover that it is in a great measure detached, and that a groove is formed around it, and, in short, that it may be removed by the slightest touch with any pointed instrument.

Ulcers of the cornea are as various in their external

characters* as in their causes; they may be superficial and extensive, circumscribed and deep, and so on; their form too is various, the deep circumscribed ulcer of the cornea is generally either circular or oval, presenting, in the first instance, merely a dimple or small cup-like depression; the extensive superficial ulcer of the cornea has often a ragged margin, and is very various as regards its figure. There is also a form of ulcer commencing near the circumference of the cornea, and gradually extending around it forming a deep groove or furrow, which, by extension backwards, penetrates the anterior chamber, or, by progression along its margin, often terminates in gangrene of the entire cornea. It has been customary to speak of ulceration as being of a healthy and unhealthy kind, and you will always include under the latter division of this arrangement, the ulcer with ragged edges and sloughing surface which I shall presently more particularly describe.

Extensive superficial ulcer of the cornea.—I have preferred this designation for the present form of ulcer of the cornea, and have applied the term circumscribed deep ulcer of the cornea, to that form of ulceration of which I shall next speak, only because they comprise some of their general and most prominent characters; not intending however to imply that the superficial extensive ulcer never spreads in the course of its progress somewhat deeply, nor meaning to assert, that the circumscribed deep ulcer is always absolutely deep, but merely deep in relation to its magnitude in other respects.

* Representations of the various characters of ulceration of the cornea may be found in the works of Scarpa (*Traité Pratique des Yeux.* Traduit de l'Italien d'Ant. Scarpa; par J. B. F. Léveillé. Planche 2, Fig. 6.)—Saunders (*A Treatise on some Practical points relating to the Diseases of the Eye.* Plate 1, Fig. 6.)—Wardrop (*The Morbid Anatomy of the Human Eye.* Plate 5, Fig. 1—2,)—and Demours (*Traité des Maladies des Yeux.* Planche 26, Fig. 1—2—3.)

The superficial extensive ulcer of the cornea is frequently little more than an abrasion of its mucous covering. It is not attended with any great degree of opacity, although the line which bounds the extent of ulceration is distinctly visible; the eye has a glassy appearance, and the cornea looks pretty much the same as that of an animal very recently dead, when its external lamina has been detached from its surface. This kind of ulcer does not usually spread more deeply than through the mucous covering and the primitive layer of the cornea, nor leave behind any important degree of opacity, and requires for its cure merely a little zinc or some slightly stimulating lotion. I have noticed it most commonly in old persons, in connexion with various forms of ophthalmia. Sometimes a trivial degree of cloudiness—the slightest form of nebula of the cornea—will remain after the ulcerated surface has healed, but this appearance does not last long and will not require the use of any active stimulants for its removal. It heals by means of colourless vessels, and is not therefore associated, during its cure with that state of vascularity of the cornea which takes place when the deep external ulcer of the cornea is undergoing the reparative process.

Circumscribed deep ulcer of the cornea.—This description of ulcer of the cornea, whether produced by a depraved enfeebled condition of the system, or by the existence of inflammation of the cornea, or of some other texture of the eye, or by the infliction of local injury, has always a smooth glassy surface, generally a somewhat circular or oval form, with smooth even edges, and presents an appearance just as though a minute portion of the corneal substance had been dexterously scooped away with a sharp instrument, leaving behind a nicely polished surface.

This kind of ulcer is sometimes produced by the

absorption of the contents of a pustule or phlyctenula, and when very small is termed by some authors a dimple of the cornea.*

The deep circumscribed ulcer of the cornea arising from an enfeebled condition of the system, or connected with a strumous constitution, will sometimes continue to extend until it penetrates the anterior chamber, and it will be remembered that this accident occurred to some of the dogs fed by MAGENDIE, on one or two articles of food only, and that they also became attenuated and enfeebled.

Ulcer of the cornea with irregular and ragged edges.—Ulcers of this description are generally preceded by considerable effusion between the corneal lamellæ, and are now and then consequent on the bursting of an abscess externally. Sometimes the interlamellar deposition may be so slight as to produce a mere cloudiness, but it generally consists of a more decided lymphatic deposition

* MR. MACKENZIE has erroneously stated that the surface of a dimple so formed is covered by the conjunctiva, which, on the absorption of the contents of the pustule or phlyctenula, has fallen down into the cavity that absorption has produced. When the contents of a pustule or phlyctenula of the cornea are absorbed, the process of absorption takes place gradually, the conjunctival covering of that texture, which had been previously raised and extenuated, sinks until it re-acquires its original level, when it ceases to be further depressed, and it is then supported and becomes re-attached to the texture of the cornea which has not been either removed or depressed, for, the contents of the pustule or phlyctenula have been deposited *upon* its surface, that is, between its primitive layer and its conjunctival covering, and had elevated and detached the latter membrane from the parts beneath it, thus forming and constituting the prominence noticed in pustule or phlyctenula of the cornea. Whenever the appearance of a dimple of the cornea is presented in connexion with ulceration of that tunic, its conjunctival covering is destroyed, and does not elongate and extend so as to fall down and attach itself to the surface of the cup-like depression produced by the absorption of the corneal texture. It is not usual for a small pustule or phlyctenula of the cornea to occasion the loss of the true corneal structure, but should this event take place, presuming that the conjunctival covering of the cornea were not at the same time destroyed, that membrane would remain stretched over the cavity, and not depressed and attached to its surface.

occurring in large quantity, such, for example, as the interlamellar secretion, taking place in conjunction with, or as a sequel of, small-pox. Sometimes indeed progressive absorption of the central part of the lamellar texture of the cornea will take place without any very distinctly ascertained cause, and the cavity so formed will, in some instances, acquire a secreting surface, the secretion of which will fill up the cavity (which is bounded on every side by the lamellar texture of the cornea) formed by the absorbents, and increase, by its pressure, the absorbent function, until eventually the lamellæ of the cornea give way, or the secreted fluid becomes absorbed. The ulcer produced, when the cornea ruptures externally, assumes the appearances which I have stated to characterize the ulcer of the cornea with ragged and irregular edges.

The edges of these ulcers are, as I have before represented, ragged and uneven and irregularly elevated, the surface of the ulcer is *cindery* and *flocculent*, and the surrounding portion of the cornea is hazy and turbid. Without great care they will extend very rapidly. Such ulcers are in the full sense of the term ill-conditioned, the previous mischief inflicted upon the cornea has been very considerable, the accompanying inflammation in the other textures of the eye is often extremely great, and the state of the constitution is always defective.*

Crescentic ulcer of the cornea.—The last form of ulceration to which I shall apply a distinct and separate name, is that which takes place towards the margin of the cornea, and which, on account of its form, I have termed the

* I suppose it is to an ulcer of this kind that Banister applies the term *epicauma*, which he describes as "a fiery boiling ulcer, rough, in colour like unto ashes, lying upon the apple of the eye, as if it were a flocke of wool."

crescentic ulcer of the cornea, for, adapting itself to the curve formed by the outline of the cornea, and being rather wide in its centre, and somewhat acuminated at its extremities, it possesses a crescentic figure. It is at first a dull opaque mark, which, after extending along the cornea, near to its margin, presents an ulcerated surface; continuing to extend along the corneal margin, (but not quite at its marginal boundary,) it deepens but does not become much wider, and in its worst form it travels nearly all round the cornea, constituting an ulcerated groove just within its margin, its two extremities gradually tapering to a point. The margin of the ulceration is surrounded on each side by a dense cloudiness, which, as it recedes from the border of the ulceration, becomes less and less distinct until it is completely lost, but sometimes the whole cornea has a turbid and cloudy aspect. I have not seen this kind of ulceration absolutely extend quite to the margin of the cornea, there is generally a small portion—a line—of cornea between the extreme edge of the ulceration and the sclerotica, which is not involved in this destructive mischief. It is a most unmanageable variety of the disease and not unfrequently terminates by destroying vision. This form of ulcer of the cornea generally occurs in old persons whose constitutions are very feeble and defective, and it is always associated with great irritability of the eye, and frequently also, with great constitutional disturbance. Its course cannot, in many instances, be arrested or impeded by the adoption of any plan of treatment hitherto ascertained—it will proceed, and often with a tardy, and if I may be allowed so to speak, a most provoking and persevering progress, totally uninfluenced by our best directed efforts to check its extension.

There are certain symptoms connected with, and produced by, ulceration of the cornea which it is necessary

to notice. In the first place, the existence of an ulcer of the cornea (unless it be one of the very small smooth forms of ulcer) renders the eye very irritable and occasionally gives rise to severe pain and inflammation; the friction of the lids upon an irritable ulcerated surface, not only favours the extension of ulceration and increases the irritability of the ulcerated surface, but also promotes and aggravates general inflammation of the eye; and perhaps we may add to these circumstances the sympathy of healthy with inflamed parts in structures so very proximate as those of the eye. These effects are observed to occur in some instances where no ophthalmia has existed prior to the formation of an ulcer of the cornea, and in such cases we may with propriety refer the origin of the inflammatory action of the previously healthy textures to the irritation produced by the ulcer, but in other instances the ulceration of the cornea has been preceded and unquestionably produced by the existence of some form of inflammation of some one or more of the textures of the eye; but, whilst the ulcer of the cornea is distinctly proved to be a *consequence* of the *previous existence* of the inflammatory condition of other textures, it is equally clear that the existence of the ulcer has the effect of aggravating that inflammation by which it was originally produced. Such appears to me to be the more correct mode of deciding a question, which has been frequently asked in the following general and somewhat imprecise terms; namely, is ulcer of the cornea the consequence of an inflammatory condition of some of the neighbouring textures of the eye or does it give rise to that inflammatory condition? In reply to these questions we may state;—1, that ulcer of the cornea sometimes arises from causes totally unconnected with an inflammatory condition of neighbouring textures;—2, that ulcer of the

cornea is sometimes produced by inflammation of the proximate structures; and 3, that in many instances where it so arises (from inflammation of the proximate structures) it has a tendency to aggravate that inflammation from which it proceeded.

There is yet another question to be decided, namely, what particular circumstances connected with an ulcer of the cornea give rise to that inflammation or irritation of the other textures of the eye, which, in some instances, certain ulcers of the cornea are known to originate? If you will apply the nitrate of silver to an ulcer of the cornea, so as to produce an eschar upon its surface, the inflammation and irritation of the eye which the ulcer previously produced will often be much diminished or totally removed, so that it would appear from this view of the subject, that the friction of the lid *upon an irritable surface* was the true cause of the inflammation of the immediately contiguous textures of the eye, and the irritation &c. of those more distantly situated, (I refer particularly to inflammation of the conjunctiva and the sclerotica, and *irritability merely* of the retina) consequent on the existence of an ulcer of the cornea. On this supposition I closed the eyes of several patients, affected with ulcer of the cornea, by means of a bandage passed with sufficient firmness upon the lids to prevent them from being moved, but the *ulceration* proceeded and the *inflammation* of the eye increased. Hence it appeared convincingly evident that although the friction of the lids upon an irritable surface sometimes causes and always contributes to the maintenance of that inflammation of the neighbouring textures with which an ulcer of the cornea is generally associated, yet that there is some other circumstance assisting in the production of that effect, which I have before stated to be that sympathy of

healthy with diseased parts, subsisting between the various textures of the eye, under the circumstances I am now presuming to exist. The application of the nitrate of silver to the surface of an ulcer of the cornea not only affords a peculiar covering to that ulcer, and thus protects its surface from the friction of the lids, but by lessening its sensibility diminishes the irritability of the neighbouring structures, in as far as that irritability depended on the increased sensibility of the ulcerated surface of the cornea, and, of course, it, at the same time, protects it to a certain extent from the influence of the atmosphere—places it, in short, more nearly in the circumstances which belong to an ulcer situated upon the neural surface of the cornea.

Ulcers of the cornea are generally, but not always, associated with inflammation of the neighbouring textures, but whenever the ulcer is extensive and irritable such inflammation always takes place; and whenever ulcer of the cornea is conjoined with a scrofulous state of the constitution, there is present considerable intolerance of light, and profuse lachrymation. Sometimes a very small ulcer of the cornea will possess an acutely sensitive surface, its irritability will be very considerable, and the concomitant inflammation of the other textures of the eye will also be severe, whilst in other instances, an ulcer of a much larger size will not be attended with much irritability of its surface, nor will it be associated with much inflammation of the eye; and this appears to be owing more to the state of the constitution than to any peculiarity of the ulcer itself, for, you will notice, by carefully attending to this subject, that the characters of two ulcers will often be precisely similar, except that one shall possess a very irritable and susceptible surface (which shall not however be distinctly indicated by its appearance) and be conjoined with great inflammation of the

various textures of the eye, whilst the other shall neither be irritable, nor connected with much inflammation of any other part. I say then, that as respects appearances, I cannot point out any clear distinctions between irritable and healthy ulcers of the cornea, which may always be relied upon, in as far as the visible characters of the ulcers alone are concerned.

The mode in which ulcers of the cornea heal is a point of considerable importance, because a knowledge of it acquaints you with the natural reparative means which it is your duty to assist, and gives the earliest intimation of the time when it becomes necessary to alter treatment. Ignorance upon this point may lead a surgeon to thwart the efforts of nature and to substitute a mischievous artificial process for a natural and salutary one.

You will know that an ulcer of the cornea has ceased to extend by the cleanness of its surface, and by the substitution of a pale grayish halo around its circumference for the more densely white cloudiness which previously existed. And you will ascertain that the process of reparation has commenced by the existence of lymphatic deposition which is filling up the ulcerated cavity; and very generally, if the ulcer be large and situated externally, by the formation of red vessels which may be seen imbedded in a fine lymph track, and proceeding from the sclerotica along the cornea until they reach the margin of the ulcer. Sometimes vessels proceed in a pencil or fasciculus, as it is termed, sometimes only a single vessel is seen, but then it is generally a large one, in other instances one or two vessels proceed from the opposite sides of the cornea. At the commencement of the healing process, and when the extension of the ulceration is completely arrested, the red vessels only pass to the border of the ulcer they are intended to repair, but, as the ulcerated cavity becomes

diminished by the deposition of new matter, the vessels are still further prolonged, and, in many cases, when the recent deposition has nearly reached the level of the surrounding healthy portion of the cornea, they are found ramifying upon its surface. As soon as the ulcer is filled up by the deposition of lymph until it arrives at the level of surrounding parts, it receives a smooth coating somewhat similar to the natural covering of the healthy cornea, and as the new substance substituted for that portion of the cornea which has been destroyed by ulceration, becomes solidified and organized, the *red* vessels supplying it contract to a minute size, so as to be capable of containing merely a colourless fluid and eventually become invisible, or they are totally removed by absorption. Upon this point I cannot speak with very decisive confidence, that is as regards the comparative frequency, as respects each other, with which these occurrences take place, for that they each happen occasionally I need not attempt to prove; however, I am disposed to think that as these repairing and organizing vessels originated in the necessities of the part, they will be, as a general rule, not merely diminished in size, but totally removed, when its requirements ceased.

Hitherto we have only explained the filling up of the cavity constituting the ulcer—the external ulcer of the cornea—and the removal of the vessels circulating red blood, which were produced for the purposes of restoration, but when these things are accomplished, the new surface becomes moulded by the absorbents, until it assumes a perfectly even and smooth appearance; any irregularity which may exist is taken away, the projecting unequal edges of the ulcer are removed, and the surrounding halo is gradually absorbed, until the visible evidences of the former existence of an external ulcer, are nothing more than the presence of an opaque instead of a trans-

parent substance—its form and the equality of its surface differing in no respect, as regards these qualities, from the healthy cornea. The same process takes place when interlamellar ulceration exists which neither bursts externally nor internally; and the same may be said of ulcer on the neural surface of the cornea, except that in neither of these two latter cases can we perceive that the reparative process is aided by the formation of vessels circulating red blood. Colourless vessels, or in other words, vessels circulating a colourless fluid, are quite competent to repair ulceration of the cornea, and when that ulceration is not situated externally, it is almost invariably repaired with the assistance of such vessels; but when large and situated externally, coloured vessels are generally required.

When an ulcer of the cornea is undergoing the reparative process, the lymph effused for the purposes of reparation, is sometimes very abundant in quantity, and overlaps the ulcerated surface, so that the ulcer appears to have been much larger than we know it has been, but this circumstance is, in fact, a very salutary occurrence, as it indicates a full capacity on the part of the secernents to complete the restorative process in a most effectual manner, whilst the well-known activity of the absorbents secures the removal of the superabundant deposition and prevents the deformity which would otherwise result.

As regards the anatomical qualities of the substance by means of which any great destruction of the corneal layers is repaired, I may state that it is in appearance a dull, or pearly-white, opaque matter, that its texture is firmer than that of the healthy cornea, that it is more vascular, and that it does not possess or acquire the *lamellar* structure of the part, the loss of which it is intended to supply. If you press it pretty firmly between the thumb and finger, and then move them in opposite directions, it does

not afford any indication of the lamellar structure at all similar to that of the healthy and natural cornea; its outer surface however is perfectly even and smooth, and the dense and consolidated mass is covered by a membrane, possessing apparently the qualities of the natural mucous covering of the cornea, and I am persuaded it possesses a secreting property.

Effects of ulcer of the cornea.—Ulcer of the cornea extending at all deeply is followed by some degree of opacity which can never be completely removed at that part where a considerable number of the corneal layers has been destroyed, but I am not disposed to assert with TRAVERS and LAWRENCE, that the cicatrix from an ulcer of the cornea is much smaller than the ulcer of which it is a consequence, from the same degree of contraction taking place here as occurs under similar circumstances in the skin; there is very little analogy in this respect between a cutaneous and a corneal cicatrix, for the texture of the cornea prevents the occurrence of that contraction and puckering which the cutaneous texture so readily permits. Indeed if the cornea became puckered and drawn together towards the point of ulceration when that ulceration had healed, vision would be rendered extremely obscure; and, of course, very defective vision would also result if the new substance were absorbed, so as to lessen (as in many instances it would do very materially if entirely absorbed) the size and the convexity of the cornea. It will be readily conceded that if a portion of the entire cornea were removed, corresponding in its size to the magnitude of certain opacities of that part, the extent and convexity of the cornea would be very much diminished.

The permanent opacity (leucoma) resulting from ulceration of the cornea, is generally much smaller than the

ulcer from which it proceeded, not from any process of contraction, but because the most superficial part of the ulcer (its circumference) is repaired by an opaque matter which admits of removal by the efforts of nature and art; and also because its *apparent* magnitude is increased by the deposition of lymph around its margin. If you were to judge of the extent of an ulcer of the cornea by the extent of the dense opacity with which it is sometimes surrounded, (the most external and the greater part of which consists of an opaque deposition without destruction of the proper corneal substance,) and were afterwards to notice, on the removal of the greater part of the opacity, the small dense mass which remains, and which points out the situation where the ulceration had penetrated most deeply, you might erroneously suppose that *contraction* from *cicatrization* had taken place.

When a small circular ulcer of the cornea proceeds very deeply you will notice, before it completely perforates that texture, a small prominent transparent vesicle, and if you snip it away, it will appear again and again, discharging on each occasion a small quantity of a limpid fluid. This state of things is termed hernia or fistula of the cornea, and there is every reason to believe that the tunic of this vesicle is, in the first instance, nothing more than the membrane of the aqueous humor, which is projected (by the pressure of its contents, and the loss of that support the corneal lamellæ are destined to afford to it,) through the ulcerated aperture. When this vesicle is snipped away, the membrane of the aqueous humor speedily reunites, and in this manner a succession of these vesicles are produced. The aperture in the cornea is gradually enlarged, the aqueous humor is discharged, the iris falls against the edge of the ulcer, and, if the case terminate very favourably, it may be restored by various

means to its natural situation, or, if otherwise, it may remain there and give rise to synechia anterior; or, it may be projected through the cornea, and constitute prolapsus iridis. When this last circumstance takes place only to a trifling extent, through a small aperture in the cornea, it is termed myocephalon, from its resemblance to the head of a fly; but it sometimes takes place to a considerable extent, forming a large dark-coloured projecting mass, which may give rise to simple staphyloma iridis, or to fungoid growths, and occasion much trouble and inconvenience.

I have never seen a distinct fistulous opening remain after ulcer of the cornea, that is, a small aperture with callous edges, discharging gradually the aqueous humor, and being difficult to heal, but Dr. Rowley and other writers speak of the occurrence as though it were by no means infrequent.

Destruction of the cornea and collapse of the eye-ball sometimes result from extensive and deep ulceration of the cornea,* and staphyloma is not unfrequently produced by the same cause, and may be partial or general, just as the extent of ulceration may be more or less considerable; and lastly, the vessels which are formed for the purposes of reparation are not always sufficiently contracted in their size, or absorbed, when that object has been accomplished, but remain and constitute one of the varieties of vascular cornea.

To sum up the consequences of ulcer of the cornea:—1, it may lead to opacity of a greater or lesser degree of

* This rare and destructive effect of ulcer of the cornea is stated by Barbette to be a common consequence of the disease. "Oculorum ulcera cæcitatem plerumque relinquunt, cornea tunica imprimis ubi tota sit corrosa, nam hinc fit ut humor aqueus, sæpe etiam crystallino effluant." *Opera Omnia Medica et Chirurgica*, Geneva. 1683. p. 166.

extent and density;—2, to staphyloma of the iris, or of the cornea, or of both these textures combined;—3, to hernia, dimple, or vascularity of the cornea;—4, to adhesion of the iris to the cornea; and 5, to collapse of the eye-ball, either from the mere discharge of its contents through a large ulcer of the cornea, or from suppuration, the result of the extension of inflammatory action to the deep-seated textures.

Treatment.—As ulcer of the cornea is very frequently the consequence of a high degree of ophthalmia, its treatment in such cases will be precisely the treatment adapted to the subduction of that inflammation; but as the effects of the inflammation and ulceration upon the cornea may be exceedingly injurious unless arrested with great promptitude, we must not neglect to bleed with greater freedom and to use mercury in larger quantity and in more frequently repeated doses than in other instances where no ulcer of the cornea existed. For example, if the same degree of inflammation of any given texture of the eye exist in two individuals similarly circumstanced, as regards age, temperament, and constitutional power, in the one case connected with ulcer of the cornea, and in the other without any ulcer of that part, you would, in the former instance, be more prompt and energetic in the employment of remedies calculated to arrest the inflammation (presuming of course that the ulceration depended on that inflammation) than in the latter case. It has been said that the free administration of mercury in those instances where ulceration of the cornea has made and is still making rapid progress, will be very likely to promote the absorption of its remaining layers; but if you have correctly determined that the ulcer of the cornea, proceeded from an acute inflammatory affection either of its texture or of that of neighbouring parts, which inflammatory affection your remedies have as yet failed to

diminish or remove, there can be no question respecting the propriety of adopting without delay that practice which will most quickly secure the removal of that inflammation of which the morbid condition of the cornea is but an effect. I do not however mean to deny that there are some examples of ulcer of the cornea, the progress of which would be assisted rather than retarded by the free employment of mercury, such, for instance, as the deep crescentic ulcer of the cornea, occurring in an old feeble individual without the previous existence of any inflammation of the other textures of the eye; certain forms of sloughing and scrofulous ulceration of the cornea, and so on; but in the remarks I have just made I have presumed that the ulcer of the cornea has distinctly originated in, and is increased and maintained by, some form of acute inflammation of the eye.

Although the occasional administration of purgatives is generally necessary during the course of any plan of treatment which may be instituted for the cure of ulcer of the cornea, yet the removal of this disease requires other remedial measures. Certainly instances may occur in which the indications for their use are most obvious and imperative.

In all cases of deep circumscribed ulcer, unattended by any unusually severe inflammation, you may advantageously apply to it the solid nitrate of silver worked to a very fine point, limiting its application to the ulcerated spot, and merely touching it in the slightest manner—not allowing the caustic to dwell upon it any longer than is absolutely necessary to secure its complete contact with the entire surface of the ulcer. You had better first fix the eye with Pelliers speculum,* and before closing the

* Wenzel, (in the first volume of his *Dictionnaire Ophthalmologique*) has written a very elaborate article on the "ophthalmostat." The various modes of fixing the eye by means of different instruments are indeed explained and discussed without much regard to the patience

lids syringe upon the eye-ball a little warm milk and water, directing the stream chiefly against the surface you have touched with the nitrate of silver, and afterwards introduce a little clear olive oil beneath the palpebræ. But if the ulcer is very irritable, and if the movements of the lids upon it occasion great pain, it will be still the more advisable to touch it with the caustic, and to do it more effectually than in the former instance, with the view of producing an adherent eschar; which will equally protect the irritable surface of the ulcer from the atmospheric air and the motions of the eye-lids. In slighter instances and particularly in the extensive superficial ulcer, a little zinc lotion or a solution of the nitrate of silver in the proportion of two or more grains to the ounce of water, will be preferable.*

In the case of hernia of the cornea with protruding vesicle, it would be advisable to snip away the projecting membrane, and afterwards to apply the pointed nitrate of

of his readers. His second volume contains representations of the "Ophthalmostat," used or invented by Heister, Fabier, Guerin (de Bordeaux), Berenger, Lecat, Bell, Pamard, Guerin (de Lyon), Casa, Rumpelt, Demours, and Pope. His delineations, though more than sufficiently numerous, are, however, very incomplete if intended to comprise all the modifications of instruments, which have been devised by different surgeons for the purpose of fixing the eye-ball.

* It is stated by Dr. Jacob, in the fifth volume of the *Dublin Hospital Reports,* that when a solution of the nitrate of silver is applied to an ulcer of the cornea it is apt to leave behind an "indelible dark speck" but I am convinced this effect takes place very seldom, and we ought not to forego the advantages resulting from the use of this excellent remedy from any fear of its occurrence. The discoloration of the conjunctiva is also another effect sometimes resulting from the very long continued use of the nitrate of silver drops, (Jacob, Lawrence, Hunt, Estlin) which must be born in mind, when prescribing them for the removal of an opacity of the cornea, or for the cure of some morbid condition of the conjunctive membrane. I ought to mention that Dr. Jacob's statement, in regard to the particular kind of ulcer of the cornea which becomes permanently discoloured after the use of the nitrate of silver and the acetate of lead, is remarkably inexact and confused.

silver to the corneal aperture, and in the event of a slight prolapse of the iris occurring, the application of the solid nitrate of silver is equally proper. And with a view of guarding as much as possible against the injurious consequences too frequently resulting from penetrating ulcer of the cornea, I would recommend the application of belladonna to the eye-brow, which if it do not altogether prevent adhesion or prolapse of the iris will limit their extent. I need scarcely remark that the extract of belladonna has very great influence in promoting the expansion of the pupil, and that it is capable not only of restoring the iris to its natural position when *merely* and *recently* prolapsed, but that when perseveringly and judiciously employed, it will, in some instances, act upon the iris with sufficient power to destroy slight and newly-formed adhesions between it and proximate parts, and restore it to its natural situation.

Counter-irritation is generally serviceable, and if the disease be limited to one eye, you may apply it to the temple of the affected side or to the forehead, but if it exist in both, the nape of the neck or behind the ears will be the better situation.

When the ulcer of the cornea has a glassy and languid aspect, and does not exhibit any appearance of the commencement of the reparative process, let me advise the application of the *unguentum argenti nitratis*, in the proportion of four grains of the nitrate of silver to the drachm of spermaceti ointment. You will often find after the use of this ointment, in the particular circumstances which have just been pointed out, that vessels will proceed to the cornea, the reparative process becomes established, and the cure is at once promoted and rapidly completed. In all languid ulcers of the cornea, where the constitution is unusually feeble and the strength depressed, where there

is no appearance of reparation, but where, on the contrary, the progression and extension of ulceration is rendered quite evident, and where, at the same time, there is not present any acute inflammation of the contiguous textures of the eye, I cannot too strongly recommend a trial of this most excellent remedy. In the cases now referred to, the local application of the strong nitrate of silver ointment, the administration of the sulphate of quinine or the carbonate of ammonia, with the adoption of a liberal and nutricious diet, will sometimes prevent the loss of an eye when its destruction seemed quite inevitable.

When ulcer of the cornea is connected with, or caused by, scrofulous ophthalmia, or associated with a feeble strumous constitution, the administration of quinine will be advisable, and will be most unequivocally called for, where the previous use of mercury has not been succeeded by benefit. Ulceration of the cornea occurring in connexion with such circumstances is very often arrested and cured with a surprising degree of certainty and rapidity by the administration of quinine in grain doses taken three or four times daily.

The progressing crescentic ulcer of the cornea is generally rendered worse by the use of mercury, more especially when it takes place in the *arcus senilis*, and is often arrested and healed by the employment of the carbonate of ammonia, and by dropping into the eye every evening a little of the diluted vinum opii ; and the same treatment with the addition of a generous diet, is necessary in those cases where the ulceration of the cornea occurs without injury or inflammation of any part of the eye, in old feeble persons or persons whose constitutional power is much lowered by a bad or a scanty diet.

As respects the management of the diet for persons,

generally, suffering from ulceration of the cornea, I may say there are no particular directions necessary different from those which apply under the same general circumstances in other morbid affections of the eye; with the use of quinine it should be of a light and nutricious character, and in those instances where the employment of active antiphlogistic measures is required, it should, of course, consist chiefly of the simplest and most unstimulating aliments.

The red vessels which traverse the cornea and terminate at the ulcer are produced, as was mentioned, for the purpose of promoting and accelerating the healing process, and you would not therefore divide them as in the case of vascular cornea, or in those instances where a large vessel containing red blood is manifestly maintaining and increasing an opacity of that texture, as may sometimes be remarked after an ulcer of the cornea has healed. This has however been done, and it is my duty to tell you that if you were to go and do likewise, the consequence of your officious interference would be, in all probability, the loss, or at least a much greater degree of impairment of the patient's vision than would otherwise have taken place. You may divide them or snip a portion of them—a portion of the entire tube—away, when they still remain after the ulcer has healed, and particularly if the extremity of them is ramifying upon the surface or within the substance of the opaque matter, which is supplying the loss of the corneal texture; but, as they either spontaneously contract or become absorbed in the majority of these cases, of course no operation of this kind should be prematurely performed—they will, I repeat, generally disappear when a necessity for their continuance ceases to exist.

In all cases of ulcer of the cornea it is of importance to

ascertain at our first examination, whether the ulceration arise from any primary affection of the cornea or depend on disease of some other part of the eye, or on a morbid condition of its appendages; for, of course, a knowledge of this circumstance will materially influence the character of the treatment we may consider it proper to adopt.

SECTION IX.—HERNIA, FISTULA, AND DIMPLE OF THE CORNEA.

HERNIA.—When a portion of the external layers of the cornea is detached, the pressure of the muscles of the globe will sometimes project its neural laminæ, in front of its remaining lamellæ;—this affection is termed *hernia of the cornea.* The size of the hernia will vary with the extent of the malady which caused it. When nearly the whole of the corneal laminæ are destroyed throughout only a small extent of its surface, the projecting vesicle consists of nothing more than the aqueous humor which has protruded its membrane covered by one or two of the corneal layers through the opening which is bounded by the healthy cornea.

Sometimes the disease which induced the hernia will continue until extensive staphyloma take place, or until collapse of the eye-ball result from the evacuation of its contents.

The treatment of the hernia alone, (presuming any other disease from which it may have arisen, or with which it was associated at an early period of its existence, has been arrested) will be chiefly regulated by the size of the projection. When of small size it is desirable to apply a solution of the nitrate of silver (about three grains

to an ounce of distilled water) night and morning, to bathe the eye frequently with the zinc collyrium (four grains to the ounce of water), to apply the belladonna above the eye-brow, to employ counter-irritation in the neighbourhood of the disease, and especially to caution the patient against using the eyes in any way requiring minute vision, and to keep in a darkened apartment. Presuming that the hernial swelling has given way, that the aqueous humor is discharged, and that the iris has fallen against the margin of the aperture, it would be prudent to touch the part carefully (and with the usual precautions) with the solid nitrate of silver worked to a very fine point, so as to contract the projecting iris, and cause the detachment of an annular slough from the edge of the opening; for, unless something of this kind be practised, the edges of the ulcer, which are for the most part very unhealthy, will be likely to slough, to continue the ulcerated action, or at best they will be very averse to accept a healthy, healing process. That form of hernia of the cornea, which consists in the extensive detachment of nearly the whole of the corneal lamellæ, is mentioned in those parts of my work which treat of ulcer and staphyloma of the cornea, or of the diseases producing them.

Fistula.*—When the aqueous humor continues to be

* " Some have recommended us to pare the cornea with a knife, but this is an hazardous operation; I saw an instance where the speculum was used by a very steady operator, who, unfortunately, cut a piece out of this coat, and though the aperture is small, it is continually discharging the aqueous humour." *A Treatise on the principal diseases of the eyes*, by William Rowley, page 142.—" *Fistula de la cornée.* Ulcère sinueux, superficiel, long, qui s' étend plus ou moins droit entre les lames de cette tunique." *Dictionnaire Ophthalmologique, par* M. De Wenzel. T. 1, page 309.—" Lorsque la cornée a été percée par un abscès, et que l' humeur aqueuse s' est écoulée, il y a fistule, et on peut faire plier le globe sous le doigt à travers une des paupières. C' est un exerçant cette légère pression, et par l'absence de l' humeur aqueuse, que l'on s'assure de l'existence d'une ouverture fistuleuse à

discharged through a minute opening in the cornea, which has existed for some time, and more especially, if the margin of the opening is somewhat hard and rounded, the condition of disease so produced is termed *fistula of the cornea.*

The aperture in the cornea may be direct or tortuous, its external opening may be visible or it may be covered by the conjunctiva, or it may exist only on its neural aspect. If the opening be direct or tortuous, providing there exist a visible external aperture, the aqueous humor is seen to be discharged, to ooze from the opening; but when there is a mere opening on its neural surface which only extends through a few of its innermost laminæ, the aqueous humor is forced into the cavity and slightly projects its external layers—gives rise to an appreciable and peculiar inequality of the mucous surface; and when, in some other instances, there exists no visible external opening, the aqueous humor collects beneath the conjunctiva close to the corneo-sclerotic junction, and forms a small semitransparent tumour in that situation.

If the disease, whatever may be its variety, is unassociated with ophthalmia, I generally recommend the patient to sit in a darkened room, and not to employ the eye in any way requiring minute vision, and to drop upon the part twice a day a pretty strong solution of the

la cornée. *Traité des Maladies des Yeux*, par A. P. Demours. T. 1, page 306.—" De corneæ ulceribus haud immerito ad propriam hujus generis morbi speciem transimus, fistulam dico, quæ nihil aliud est, quam alcus excavatum, angusto tubulo et orificio ampliore vero fundo præditum. Sæpe, tantum non semper et orificii labia callosa inveniuntur." Clemens, in *Scriptores Ophthalmologici Minores*, *vol.* 1, 132. [Although this able writer has drawn largely from the dissertation (*De fistulis corneæ*) of Mauchart, he has described the varieties of the disease with a fidelity and care which no subsequent writer has approached.]—There is an account of an interesting case of fistula of the cornea in the fifth volume of the *London Medical Gazette*, page 224.

nitrate of silver. If the external opening in the cornea be minute and have existed for a long time, if its edges appear like the healthy cornea, and are indisposed to heal, I would recommend the part to be touched with the solid nitrate of silver, so as to produce a slough from its margin.

The disease has occurred in one instance under my own observation as a congenital defect; I have seen it remain after a wound of the cornea, after the section of the cornea for the extraction of cataract, and from the minute circumscribed ulcer which has penetrated the anterior chamber.

Dimple.—Phlyctenula and ulcer of the cornea sometimes leave behind a cup-like depression of the cornea,—it appears as though a minute portion of it had been scooped away. It is covered by a membrane similar to that which covers the surrounding part of the cornea, and which appears to possess all the properties of the original tissue. The power of the lamellar texture of the cornea to form its proper covering whenever it has been destroyed by a simple and limited from of ulceration is necessary to the continuance of the function of the part, exposed as it is so very frequently to the occurrence of this variety of disease.

The inconvenience produced by the reflexion of light from its surface is by no means inconsiderable when the dimple exists at the central part of the cornea, it is, in fact, the same, though in a greater degree, which takes place in conical cornea (see the opinion of Brewster in Wardrop's work), but it cannot be overcome by the use of glasses, as may be accomplished with respect to the defect occasioned by the lesser inequalities on the surface of the part in conical cornea.

SECTION X.—VASCULARITY OF THE CORNEA.

Coloured vessels—vessels circulating red blood—sometimes extend upon or between the laminæ of the cornea, and constitute what is termed, vascularity of that texture. They are usually of considerable size, and unless attended with general and considerable opacity of the cornea, are few in number.

You will sometimes find red vessels merely encroaching for a short distance upon the circumference of the cornea, in other instances reaching to its centre; sometimes giving off several smaller vessels, but more generally pursuing their course and arriving at their termination as a single tube without giving off any visible branch. There may be some degree of cloudiness—a sort of lymph track—in the neighbourhood of these vessels, and more particularly in their immediate seat and course, and in other instances they will be found to proceed to a large and dense opacity of the cornea. Such is the condition of disease to which the term vascularity of the cornea, is strictly applicable, that is, the existence of coloured vessels upon or between the laminæ of the cornea, which have a distinct and definite course, and do not exist in great numbers or minute ramifications, for, in the latter case, the disease is termed *pannus*. The vessels themselves are, for the most part, situated superficially, generally between the conjunctival covering of the cornea and its primitive layer, and sometimes, as it would seem, upon its surface.

Vascularity of the cornea may be combined with albugo, leucoma, or nebula of the cornea, with chronic corneitis, and with a vascular and granular condition of the lids; or it may be owing to the influence of preceding inflammation of the cornea, or to some source of external irrita-

tion, as happens to masons' labourers, and others whose eyes are exposed to the mechanical irritation produced by the contact of particles of lime, or pearl or metal dust. The coloured vessels which are formed for the purpose of repairing ulcers sometimes remain long after the ulceration is healed, as though prolonged distention had so far destroyed their tonic and elastic properties as to take from them the capacity to contract their dimensions when their continuance as visible vessels became no longer necessary. I have represented in a former *Section* that coloured vessels so circumstanced are usually removed —that they are sometimes merely contracted in their size, but more generally absorbed, when the occasion for their continuance ceased to exist, and it is to those few instances in which this salutary process does not take place that I am now more particularly referring.

Diagnosis.—As simple vascularity of the cornea differs from pannus sometimes only in degree, and, as the treatmcnt of the two diseases varies in some instances in many very material circumstances, I shall say a few words respecting the mode of distinguishing them. Vascularity of the cornea is distinguished from pannus by the absence of much general opacity, and by the distinctness and fewness of the coloured vessels constituting the condition of vascularity, but whenever they are either so numerous, so minute, or so abundant in their ramifications, as to tinge the cornea of a red colour, and present to the naked eye an almost uniformly red surface, the disease is termed pannus. When the cornea is the seat of inflammation there may be one or more vessels encroaching upon its margin or extending upon its surface or through its texture to a greater distance, but then the pain, the zonular arrangement of vessels, the prominence of the cornea, and its general cloudiness, will surely prevent any well-in-

formed surgeon from confounding this inflammatory state of the cornea, with mere vascularity of that part.

Treatment.—The treatment of vascularity of the cornea will vary with the cause producing it, and the condition of the eye, in other respects, with which it may be connected. In those instances where it seems to arise from the existence of chronic inflammation of the cornea, or acute ophthalmia, or any form of inflammation of the various textures of the eye, its treatment will be merely that of the original and inflammatory malady. And I may here remark that vascularity of the cornea arising in connexion with such forms of inflammation is more generally characterized by the enlargement of several vessels upon the margin of the cornea, whilst that form of it produced by a vascular and granular condition of the lids, is distinguished by the enlargement of a few vessels diffused over various parts of its surface, and, on the contrary, the vascular state of the cornea produced by, and associated with, albugo or leucoma, consists of the enlargement of a single vessel or a pencil of vessels, or of two red vessels which pass from opposite sides of the eye and terminate in the opacity.

Vascularity of the cornea associated with an ulcer of that texture is usually only of temporary duration, and does not, at least whilst the ulcer exists, render any treatment for its (the state of vascularity) removal necessary.

Admitting the foregoing exception, it is, I presume, scarcely necessary to point out the propriety of curing any disease of which the vascular state of the cornea is obviously an effect; such for instance, as a granular condition of the lids; incurvation of the tarsal cartilage, inversion of the ciliæ, and so on, for whilst they are permitted to continue, the curative efforts, if directed solely to the morbid state of the cornea, will be inevitably

fruitless. But presuming that the vascular state of the cornea continues independently of such influence, presuming that although originally produced by some other affection which you have been enabled to remove, the enlarged vessels still remain, what method would you adopt to promote their diminution or procure their removal? If there are several vessels extending upon the margin of the cornea for a short distance, unattended by any active inflammation, the application of mild stimulants would be preferable to division or excision, and the same may be said in other instances where several enlarged vessels are dispersed over the cornea in consequence of the previous existence of a granular or some other morbid condition of the palpebral conjunctiva. You may commence your treatment with a weak solution of the sulphate of zinc and gradually increase its strength, you may then employ a pretty strong solution of the nitrate of silver or the vinum opii; and if these means are insufficient—if the enlarged vessels still remain notwithstanding a proper degree of perseverance in the use of such stimulants—you may use the nitrate of silver ointment, commencing with a preparation of three grains of the powdered nitrate of silver to the drachm of spermaceti ointment, and increase its strength gradually as the case advances towards recovery. But when one or two vessels only exist, or a pencil of vessels, particularly when they pass to an albugo or leucoma, I should advise you to raise them with a forceps at a little distance from the margin of the cornea, and to snip away a small quantity of the entire tube of each vessel, and to perform this operation upon the trunks of as many of the largest of these vessels as may be present, and to repeat it when their divided mouths inosculate, or as soon and as often as the once divided tube becomes again continuous. If you merely divide these vessels with a lancet, they will very

speedily reunite, and you will very probably inflict a good deal of injury by your attempts to sever them in this manner, but by first raising them with the forceps and afterwards excising a portion of the entire tube, you occasion less pain and inflict less injury upon the parts upon which you are operating, and, at the same time, render your operation much more efficacious than it would be if you adopted the former mode of procedure.

SECTION XI.—PANNUS.

The disease called pannus is nothing more than a relaxed, thickened, opaque, and vascular condition of the anterior membrane of the cornea, and is almost invariably produced by the continuance of purulent or strumous ophthalmia; or, by the friction of the palpebral conjunctiva which has become vascular and granular in consequence of some diseased action of which it has been the seat; by some other source of continued external irritation; or by chronic inflammation of the cornea. It is this form of disease which may occasionally be seen in some of the discharged soldiers formerly engaged in Egpyt, and I am unacquainted with any better illustrations of the disease than the eyes of some of these individuals present. On this view of the subject, the disease (pannus) is not produced by any *active* and *acute* inflammation of the cornea, but results either from chronic corneitis, from the irritation produced by the morbid lining of the palpebræ upon its conjunctival covering,* or from some other source of irritation applied to the surface of the cornea.

* The friction of the rough and granular conjunctiva upon the cornea, in those instances where pannus originates in such condition of

We will now proceed to trace the various changes which take place in the order of their occurrence. The cornea first becomes nebulous and a few small coloured vessels are observed ramifying upon its surface, the nebula becomes more and more developed as though a fine lamina of some partially opaque substance were placed upon its surface, the vessels ramify more and more minutely, until they present a red appearance in which the distinction of the ramification—the definite branching—of vessels is no longer to be detected by the naked eye. This state of things may be partial or it may be general; if it be partial merely there is a red patch, placed as it were upon the cornea, which does not present a florid appearance in consequence of the quantity of opaque matter with which the minute coloured vessels are intermixed. This opaque matter, which is in fact the tissue in which the vessels are formed, always precedes their development, sometimes extending over a larger surface than is occupied by the minute series of vessels, in which case there is said to be a general nebulous state of the cornea with a partial condition of pannus, but I have never seen it present that dense appearance which is produced by an albugo or a leucoma, or that shining pearly aspect with which these forms of opacity of the cornea are occasionally associated. But the pannus may be more extensive; it may occupy the whole of the cornea, and give to it an uniformly red surface, a redness which is however widely different from the scarlet surface produced by that vascular state of the *palpebral* conjunctiva so commonly present

the lining membrane of the lids, is only connected with the morbid changes wrought in and upon the cornea, as their cause, by producing a state of irritation—a condition of chronic inflammation—of its conjunctival covering.

under such circumstances; for, being blended with, or superadded to, a white opaque surface, its colour is paler, certainly much less bright and florid than a surface rendered red merely by an increase of the number and size of its vessels, unmixed with any other matter calculated to diminish its floridity. Sometimes the sclerotic conjunctiva will have undergone a similar change to that which has occurred in its corneal division,—it will be thickened, its connexion with the part beneath will be relaxed and its vascularity increased; but this alteration in the sclerotic conjunctiva forms no *necessary* part of the disease.

Thus, then, there will be detected, in the changes I have just enumerated,—1, the existence of chronic inflammation of the conjunctival covering of the cornea;—2, the deposition of opaque matter within its texture and upon its surface; and 3, an increase in the size and number of its vessels, partly occasioned by the mechanical irritation produced by the friction of the morbid lining of the palpebræ, and partly for the purpose of vitalizing that product of inflammatory action, which, in the various textures of the body is sometimes beautifully, completely, and richly organized—I mean coagulated lymph.

The conjunctival covering of the cornea is first thickened, rendered opaque and vascular, and, in many instances, the proper substance of the cornea is not materially changed whilst these alterations have taken place upon its surface; but in the progress of the disease, the infrajacent texture becomes involved in the morbid action, it loses its transparency, and, in many instances, its lamellar texture, and becomes consolidated, opaque, vascular, and thickened also, so that in the worst forms of long-continued pannus the whole or nearly the whole substance of the cornea has undergone those changes

which unfit it for the transmission of light; and no measures which may be then employed with a view of removing the morbid condition of its conjunctival covering, even if so far successful, will have any materially useful influence upon the general structure of the cornea and consequently will not succeed in restoring vision.

Treatment.—After you have removed, as far as may be practicable, any source of irritation to the surface of the eye (of which the morbid state of the palpebral conjunctiva—an incurvation of the tarsal cartilage—and an inverted condition of the ciliæ—are the most frequent) and lessened the tendency, if any such exist, to general vascularity of the eye-ball, I should advise you to prescribe mild astringent and stimulating applications, such as the alum or zinc lotion; to employ some form of permanent counter-irritation, and to administer an occasional dose of purgative medicine; you may then have recourse to more active stimulants, such as a solution of the sulphate of copper, or a solution of the nitrate of silver in the proportion of two grains to the ounce of water, and as soon as the eye is enabled to bear it, apply by means of the blunt extremity of a probe, as previously directed, a small quantity of the nitrate of silver ointment, prepared as I before advised; increasing its strength by degrees, as circumstances may render requisite. This is indeed by far the most useful remedy for the cure of this disease, and not only cures most effectually as far as any measures are capable of curing it, but in a very much shorter space of time than any other known remedial means. Of course, you will not commence its use whilst any active inflammation is present, nor continue it if any inflammatory symptoms arise to negative the propriety of persevering in its employment, nor repeat its application more frequently than the local or general susceptibility of the patient may

permit; but bearing these circumstances in mind, I am prepared to recommend most strongly a trial of its efficacy in all cases of pannus, more particularly as a conclusive part of the treatment.

Sometimes it may be necessary to divide the trunks of one or two vessels, or indeed to isolate a small portion of the cornea from the conjunctiva by making a pretty free incision around its margin,* but such practice is, in general, extremely useless and improper, inasmuch as the organization of the thickened, relaxed, and opaque covering of the cornea, is too perfectly and completely established to be much influenced by such a measure; for you will remember that when the whole of the cornea is affected with pannus, which has existed for a long period, the morbid structure derives a portion of its vascular supply from the vessels of the cornea—from the nutrient tubes of the deeper-seated lamellæ—as well as from those of the conjunctiva which covers its surface. Thus, then,

* In MONTEATH'S Translation of WELLER'S *Manual of the Diseases of the Human Eye*, (page 215) there is the following interesting statement respecting the treatment of this troublesome disease. "In place of cutting out portions of the individual vessels, I generally, in obstinate cases of this disease, cut out a portion of the conjunctiva, from a line to a line and a half in breadth, all round the edge of the cornea. This operation is performed by a small pair of eye-scissors, and a fine pair of forceps, and must be done slowly and deliberately. So early as the second day after this operation, nearly two lines of the edge of the cornea will have already become transparent; the clearing goes on progressively from the circumference to the centre. The latter part may not regain its transparency for weeks or months, owing to the greater density of all the tissues at the centre of the cornea. This operation will not effect a cure, if the patient be at the time in a state of scrofulous dyscrasis or fever, it often rather does harm. In such cases, the grand object, is improving the general health, for unless this be effected, the scrofulous pannus may last for years. Many eyes affected with scrofulous pannus are destroyed, by being continually teased and irritated by local applications, which would have recovered completely, had the Physician or Surgeon not disturbed the eyes, and turned the whole of his attention to the general health."

the treatment of this troublesome affection, includes 1, the removal of the cause which gave rise to it;—2, the subduction of any inflammatory state of the eye which may be present;—3, the use of mild astringent and stimulating applications which may be gradually increased to very powerful ones; and 4, in very obstinate and severe cases, where large and distinct vessels are found passing to the cornea, the excision of a portion of their entire tube or, in those few instances which are favourable for the operation, the insulation of the conjunctiva from the margin of the cornea by an incision through its entire texture, varying, as respects its extent, according to circumstances, but never exceeding, as a continuous incision, a third of the circumference of the cornea. The method of treatment is, in fact, chiefly of a local nature.

SECTION XII.—STAPHYLOMA OF THE CORNEA.

The term *staphyloma* is applied to a preternatural projection of some of the coats or membranes of the eye, and is always associated with some morbid change either in the prominent coat or membrane, or the contents of the globe, is attended with loss or impairment of vision; and usually results from inflammation, attenuation, or division of some part of the external tunics.

When the sclerotica is the projecting part, the disease is termed staphyloma scleroticæ, and when the morbidly prominent sclerotica is so far attenuated as to assume a dark blue appearance by permitting the subjacent choroid to be partially seen through it, it is then termed staphyloma of the choroid and sclerotica. Sometimes the iris protrudes through various apertures in the cornea, or it is seen at several points through the partially transparent

cornea, giving rise to an appearance which has not inaptly been expressed by the term *staphyloma racemosum;* but when the cornea has been extensively destroyed, and the iris protruded in the form of a large convex mass, which has become adherent to the margin of the remaining portion of the cornea, it has been called staphyloma iridis, and this is the only true staphyloma of the iris. But the cornea alone may be the projecting part, and it is to the prominence formed by the yielding of the cornea, and which has received the name of staphyloma of the cornea that I shall now more particularly direct attention.

Such then are the conditions of disease which are respectively expressed by the terms—staphyloma scleroticæ —staphyloma scleroticæ et choroidis—staphyloma iridis —staphyloma racemosum—and staphyloma corneæ.

Staphyloma of the cornea has received a variety of names, in accordance with its form, its extent, and its complications; for instance, when the whole of the cornea is equally and extensively projected without any particular elevation at any one point, the disease so formed is called, the spherical staphyloma of the cornea; but when it rises in the form of a blunt cone, its centre being very much more prominent than its circumference, it has received the name of conical staphyloma of the cornea. Again, when the disease occupies only a part of the cornea, it is designated *partial staphyloma of the cornea,* and *total* when the whole of that membrane is involved; *simple* when one form of staphyloma only exists, and *compound* when one form of staphyloma is superadded to another—thus, when a partial conical staphyloma is ingrafted upon the total spherical staphyloma, the disease, so formed, is termed compound staphyloma.

The conical staphyloma is generally produced by the circumscribed ulcer of the cornea, or by onyx, or by very

extensive lymphatic deposition between its lamellæ, and on this account it is more frequent at its lower part—at that part where onyx is most generally found; but the spherical staphyloma more commonly results from those diseases which, either by producing an extreme degree of chemosis, or by some other means, diminish the vitality and lessen the elasticity of the cornea, without proceeding so far as to cause its actual destruction, except perhaps of its most superficial layers.

When an ulcer of the cornea or onyx have materially diminished the amount of resistance always offered by the healthy cornea, to the pressure it (in common with the other external tunic of the eye) sustains during the action of the muscles of the globe, it gradually yields, and of course chiefly at that part where the power of resistance is least considerable. It is on this account that staphyloma proceeding from either of these causes, that is, circumscribed ulcer of the cornea and onyx, is almost always conical; the healthy structure of the cornea being not only adequate to oppose the distending agency, but affording also a sufficient degree of support to that part of the morbid cornea, with which it is in immediate or very proximate connexion, to prevent it from yielding so much as its more central part, which receives no such assistance to enable it to resist the constantly-operating distending power, and in this way the central part of a staphylomatous cornea, diseased to a very circumscribed extent only, becomes not *merely* much projected, but projected in a conical form. This is, I believe, a correct description of the progress of conical staphyloma of the cornea, and an accurate account of the circumstances determining its form.

I have said that in the spherical staphyloma the whole of the cornea is involved, and that it may acquire an

enormous size, so as to protrude the lids, and prevent them from being closed over the staphylomatous enlargement. The conical staphyloma never acquires so large a size as the spheroidal, and the following explanation of the condition of parts actually involved in the disease in the two affections, and the condition of other parts not immediately implicated, but which sometimes change their relative situation in the progress of the affection, will explain the cause of this circumstance. In the conical staphyloma of the cornea, the entire texture of that membrane is generally found thickened, more or less opaque and consolidated—its lamellar arrangement being destroyed; when the disease is developed to a certain extent the iris is found plaited upon, and intimately identified with, the neural surface of the cornea, the lens is in immediate contact with the iris, and an increase of the vitreous humor sustains the figure of the eye-ball and is substituted for the diminished secretion of aqueous humor; but, at the commencement, the parietes of the staphylomatous projection are thinner than the natural structure of the cornea, particularly at the centre, and only become thickened by the duration of the disease, with a view of preventing them from extending still further; and, when the disease is fully developed, it sometimes happens that the point of the staphyloma is rendered thin by absorption, so that it eventually bursts, discharges its contents, and may in this way lead to a cure of the malady.

I do not mean to say that even the moderate stage of development of the conical staphyloma, whether occupying the whole or merely a part of the cornea, is invariably accompanied by a thickening of its entire texture, for I have examined the cornea in some cases after its excision, and have found it to differ greatly in this respect;

it has been generally thickened in nearly every part of its extent, but at one or two points it has been rendered much thinner than when in its natural state. RICHTER asserted that the cornea, under such circumstances, was not only rendered thicker, but that instead of presenting on its neural aspect a hollow or concavity it was a solid mass, being filled up by deposition which was generally of a lymphatic character, and he further stated that it could not consequently arise and be maintained, as was stated by BEER, by pressure operating from within the globe, combined with attenuation of the corneal texture. SCARPA also believed that at the highest degree of the disease, the cornea, instead of being diminished in thickness, was, on the contrary, entirely compact and solid internally, but he admits the existence of exceptions in which the staphylomatous projection can only be considered solid in regard to its contents which, in these exceptions, he describes as consisting of the iris, the crystalline lens, and sometimes a portion of the vitreous humor. But in conical staphyloma of a small portion of the cornea only, in those instances where an extremely acuminated projection arises from the cornea, its base occupying only a very small portion of that tunic, there is sometimes nothing more than an adhesion of the iris to the circular base of the staphyloma, the capsule, lens, and vitreous humor, retaining their natural situation, but in other instances the iris is plaited on the whole of its inner surface, and is projected into the cavity of the staphyloma, the crystalline lens resting against its marginal base, and in this way leaving a space between its anterior aspect and the neural surface of the iris which contains a portion of aqueous humor; in fact, the base of some staphylomata of this description is not sufficiently large to admit the lens within their cavity. A staphyloma so circumstanced is not likely to increase much in magni-

tude, for, the pressure of the contents of the globe produced by the action of its muscles would operate on the posterior surface of the lens, and, by transmitted influence, upon that portion of the healthy cornea by which its margin was sustained, and unless we admit either an inequality in the absorbent and secreting function, on the part of the surface of the cavity intervening between its (the lens) anterior aspect and the neural surface of the iris, or give to the fluid it contains an expansive quality, there is no mode in which pressure from within could be made to operate upon the distended portion of the cornea. These remarks however only apply to those instances of small conical staphyloma in which the lens is resting against that margin of the cornea which constitutes the base of the staphyloma; for, in consequence of the adhesion of the iris to the cornea in the other examples of this variety of staphyloma, and the close contact of the lens with the iris, the chambers of the eye are completely obliterated, and the increase of the disease either altogether prevented or materially retarded. There is at least one important reason why the conical staphyloma never acquires so great a size as the spherical staphyloma, for by reason of its acuminated form, ulceration of its summit occurs before it has sufficient time to acquire any great degree of magnitude.

Now the progress of spherical staphyloma does not materially differ from that of conical staphyloma. When the corneal texture becomes from any cause—whether from reduced vitality, loss of substance, or diminished elasticity—incapable of resisting the pressure of its contents under the influence of the action of the muscles of the globe, it gradually yields in every part of its surface, the aqueous humor increases in quantity in proportion as the cornea is protruded externally, the anterior chamber

becomes more and more capacious, until inflammatory and other changes push the iris forwards, so that from being more distant than natural from the neural surface of the cornea, it gradually approaches and becomes united to it throughout its entire extent, the anterior capsule and lens retaining their natural situation, so that whilst the anterior chamber is obliterated, the posterior chamber becomes much increased in size; and in this way the whole of the cornea is exposed to an equal degree of pressure from within, by reason of the pressure of the contents of the globe, produced by the action of its muscles. Sometimes this state of parts is preserved until the staphyloma, having arrived at its highest degree of development, becomes stationary or has acquired so great a size as to render its removal necessary, or, until its summit becomes attenuated by absorption, ruptures and discharges its contents, and by a frequent repetition of this occurrence (for when once this event has taken place, it will be very likely to be repeated from the gradually diminishing thickness of the newly-formed membrane) leads to a natural cure. But in other instances, the lens is pushed forward, the chambers of the eye are obliterated, and the course of the disease is the same as though the posterior chamber and the proper situation of the iris were maintained; for, as regards the effect upon the cornea, it can make no difference whether the aqueous humor or the anterior surface of the lens be pressing against its neural aspect; the pressure will, in both instances, be the same, and in each case will be transmitted from other bodies before it reaches that fluid or solid which is in immediate contact with the posterior surface of the cornea.

The cornea is then in these cases at first attenuated, in its progress it becomes unequally thickened, so as to produce that irregularity of surface certain forms of staphy-

loma present; for example, if no point of the staphylomatous cornea be much thinner than another, its surface will present a smooth and equable convexity, but when the cornea is so unequally thickened as to present at different points, a very variable degree of resisting power to the propulsion of the contents of the globe, it will be bulged forwards in one or more points, and present, in correspondence with the number and magnitude of these lesser projections which are superadded to the larger one, an irregular and tuberculated aspect. Sometimes the summit of one of these tubercles or small projections from the surface of the staphyloma bursts and discharges part of its contents, and whenever the fluid reaccumulates it is again evacuated by the same means, and in this way the staphyloma sometimes experiences a natural cure.

Now, the first change which occurs in the structure of the cornea in the variety of the disease we are now considering, independently of the loss or impairment of the transparency of its remaining layers, is diminished elasticity;—2, general attenuation;—3, increased thickening consolidation and loss of its lamellar arrangement; and eventually partial thinning, so that unless an operation be performed, it gives way at one or more points, and establishes either a natural and permanent cure or permits a temporary diminution of its size.*

It will be remarked that at the commencement of the disease, and before the staphylomatous projection acquires any considerable magnitude, the iris is *entire*, although plaited upon and adherent to the under surface of the

* I have described many of the various morbid changes which take place in different parts of the eye in the progress of staphyloma from preparations in my possession, which have been carefully examined by many medical gentlemen, and which, I trust, fully justify and confirm the views I have taken of the pathology of this affection.

cornea, but after a time, when the staphyloma enlarges, the iris, not being able to expand sufficiently to cover its entire surface, and being at the same time firmly and securely attached to an expanding texture, is torn, and acquires a stellated or a reticulated appearance. Thus then, as regards the state and situation of the iris in the progress and in the various stages of spherical staphyloma of the cornea, it is first more distant than usual from the neural surface of that tunic; by degrees it approaches it until it becomes expanded upon and adherent to its surface in an entire state; but as the disease increases in magnitude, it is lacerated and acquires a stellated or a reticulated aspect. It is therefore no *essential* character of staphyloma of the cornea in all its stages, that the iris should be accurately applied to the *whole* of its neural surface.

In every instance that portion of the cornea which is staphylomatous has either partially or totally lost its transparency; for, if it arise from ulceration of its layers, those layers are never restored by a transparent substance; if from onyx, the organized interlamellar deposition, which may take place, never possesses perfect transparency; and if from diminished elasticity, not only has the translucency of the cornea been partially or totally destroyed by the disease which has occasioned that loss of elasticity, but the deposition which has very probably taken place on the surface of the cornea, with a view of enabling it to resist the impulse from behind, will be of an opaque character. This thickening of the walls of a staphyloma, at a certain stage of its existence, and at particular parts of its paries, may be produced either by a thickening of the conjunctival covering of the cornea, when that texture yields from diminished elasticity independently of loss of substance, or, if that be destroyed, by the deposition

of opaque matter upon the external lamina of the cornea, which sometimes becomes exceedingly vascular—the ramifications of blood-vessels within and upon it are sometimes beautifully distinct and extremely minute and numerous.

Staphyloma of the cornea frequently forms after neglected or mismanaged purulent ophthalmia, and after variolous ophthalmia, either from ulceration or diminished elasticity of the cornea, produced by the same cause as that which leads to such extensive interlamellar depositions, as may be noticed in connexion with or as a sequel of, these maladies. I do not however deny that the existence of such extensive interlamellar depositions, may, *per se*, exercise an injurious influence upon the cornea, but I am disposed to think that the yielding of the cornea so frequently noticed under such circumstances is rather to be attributed to diminished elasticity, or to some change wrought upon its texture by which its power of resistance is diminished, without sustaining any actual loss of substance, in consequence of the inflammation of which the interlamellar deposition is but an effect, than to any mischievous influence,—such, for instance, as the absorption of the corneal lamellæ—produced by the presence of the interlamellar deposition; and I mention this circumstance partly with a view of directing attention to the differences in the anatomical qualities of the cornea in early and in adult life. In very early life the cornea is thick, and comparatively loose and soft in its texture, so that the anterior chamber is at that period extremely small, and the iris nearly in contact with the posterior surface of the cornea, whilst in adult and advanced life, it is much thinner, more compact and dense, its interlamellar tissue in particular being much less extensile. On account of this looseness and softness of the corneal

texture, and particularly of the extensile qualities of its interlamellar structure in very early life, purulent or lymphatic deposition may take place within its substance or between its lamellæ in considerable quantity, so as to bulge it forward, rendering its exterior somewhat acuminated, and yet it may recover without becoming staphylomatous; whilst the cornea of the adult will not only not admit of so large an amount of inflammatory deposition, but generally becomes staphylomatous, and incapable of restoration from a much diminished degree of injury.*

When the staphyloma is partial and occupies some part of the cornea near to its circumference, and scarcely at all implicates the pupil, the patient may be enabled to see

* In explaining that staphyloma may arise in connexion with the various pathological conditions of the cornea I have just pointed out, I may further mention that Mr. Wardrop appears to be of a contrary opinion. "As far," says Mr. Wardrop, "as I have been able to observe, Staphyloma never occurs unless the cornea has been previously ulcerated, and unless the ulcer has penetrated into the cavity of the aqueous humour, or destroyed the cornea as deep as its internal tunic. "Hence the internal surface of the cornea adheres to the iris in almost every case of staphyloma, so that, in this disease, the anterior chamber is often found almost entirely obliterated. This takes place in consequence of the discharge of the aqueous humour through the ulcer of the cornea allowing the iris to come in contact with the cornea, and thus to form adhesions with it. The adhesion between the cornea and iris happens most frequently, and to a greater extent in children, for in them the cornea is much thicker than in adults, and is very nearly in contact with the iris even in the sound eye." (p. 107). I believe the foregoing statement to be, in many respects, contradictory and erroneous. In the first place, we know that staphyloma of the cornea may occur unconnected with ulcer of that texture; secondly, the adhesion of the iris to the neural surface of the cornea may take place independently of the removal of the aqueous humor by an external opening; and thirdly, if the staphyloma occurred merely and only from ulceration of the cornea, and the adhesion of the iris from *evacuation* of the aqueous humor, such adhesion of the iris would not, as Mr. Wardrop has stated, occur most frequently and most extensively in infants affected with corneal staphyloma, because the cornea at that age very often becomes staphylomatous independently of external ulceration, and merely in consequence of impaired vitality and diminished elasticity, or from absorption of a great portion of its central lamellar texture, owing to the presence of a large quantity of interlamellar deposition.

pretty distinctly in every direction, except on that side where the staphylomatous projection is situated; but, in those instances where either the entire cornea, or that portion of it situated opposite the pupil is staphylomatous, the power of vision is totally destroyed. In some few instances you may have an opportunity of making an artificial pupil away from the staphyloma, that is, where the iris is observed to be healthy, or nearly so, a portion of the cornea tolerably clear, and the deep-seated textures of the eye apparently uninjured.

When the staphyloma is large it may excite irritation in the tarsal margins, and may itself become the seat of acute or chronic inflammation, and such attacks of inflammation are prone to harass the patient so much that he will gladly consent to the adoption of any measures that may be proposed for his relief. In other instances the opposite eye is sympathetically affected, vision is much impaired, the organ is rendered irritable, and unless the staphyloma be removed, the previously healthy eye may be the seat of acute inflammation, which I have many times known to terminate in staphyloma, as though when one eye has become the seat of staphyloma it gave a tendency to the same disease in the opposite organ. This then is one of the most important evils arising from the existence and the continuance of a large staphyloma of the cornea, and one for the cure of which the removal of the malady by a surgical operation is very frequently rendered necessary.

Before the staphylomatous cornea acquires a degree of magnitude sufficiently great to produce from its size this particular irritation, its surface generally becomes attenuated and ulcerated, and its contents are discharged through the ulcerated aperture; but the case is widely different with respect to the spheroidal staphyloma, for the equality and

smoothness of its surface, although often leading to great protrusion of the palpebræ, do not cause the pressure of the lids in their movements upon the globe to be especially sustained by any one point of its surface merely, and ulcerative absorption is not therefore excited, except in some very rare instances, and then not in consequence, as far as my observation extends, of the unequal friction and pressure of the lids. This then is an important part of the history of, and of the distinctions subsisting between these two varieties of staphyloma of the cornea.

When the staphylomatous enlargement is very considerable, it may overhang the lower lid and give a morbidly incurved direction to the tarsal cartilage so that the palpebral margin and the ciliæ will be turned towards and will much irritate the eye-ball. I have seen this form of entropium so produced many times, and have in such cases generally witnessed that the result has been a beautifully vascular state of the staphyloma in the neighbourhood of the part where it was chiefly irritated by the friction of the eye-lashes upon its surface; it has also been particularly depressed or furrowed where it has sustained the pressure of the morbidly incurved tarsal margin. Two cases in illustration of this fact are now under my care.

When staphyloma of the cornea of large size has existed for some time accompanied with a certain degree of inflammation of the sclerotica, this membrane becomes dark-coloured and attenuated around the margin of the cornea, and, merging as it were into the base of the staphyloma, gives rise to an enormous projection, a projection infinitely larger than the protrusion of the cornea alone is competent to produce; but, in the general, this fibrous tunic

does not readily yield, and evinces no disposition to participate in the morbid enlargement of the tunic it incircles.

In the course of my remarks upon staphyloma, I have been especially anxious to draw attention to the cause of its increase, for that is, I think, a most important point connected with its pathology. If indeed its increase depended on the pressure produced by the augmented secretion of the aqueous humor compared to that of absorption—if an accumulation of that fluid in consequence of the diminished amount of absorption compared with that of secretion took place, and thus led to the mechanical expansion of the cornea—then it is clear that the repeated tapping of the globe or the establishment of a fistulous aperture in the cornea would supersede the more important operation usually performed for the cure of staphyloma; but that such an increase is not the cause of the enlargement is proved not only by the progression of the disease when this mode of treatment has been adopted, but by the still more decisive fact which a knowledge of the secreting and absorbent function supplies. We are induced to believe that the secreting and absorbent functions of the eye are regulated by the equable pressure the surrounding parts afford to the contents of the globe, because we are unacquainted with any instance in which any irregularity in this respect occurs so long as the external tunics are competent to yield that support to an efficient extent, and because accumulation and increase of this secretion generally follows a diminution of that support in the proportion of that diminution. The pressure exerted upon the external tunics of the eye in the instance of staphyloma does not primarily proceed from any undue plenitude of its contents, but from their propulsion forward by the pressure exerted upon them by

the muscles of the eye-ball, so that whether its contents are more or less ample they will be urged against every part of its interior, and will, of course, induce a yielding of that morbid part which is least adequate to resist the force with which they are propelled against it; but, as this force will be most considerable when the eye-ball is in the extremest state of plenitude, so the yielding will be most considerable where such a state of plenitude exists.*

* It would be improper to determine the natural function of the chambers of the eye, from the circumstances noticed when the anterior chamber becomes obliterated, as in the instance of spherical staphyloma of the cornea, inasmuch as we cannot tell what change may have taken place in the absorbent surface of that chamber under such circumstances, any more than we can explain the alterations effected in its secreting functions; but, attempts have been made to prove, what at present rests on the weakest and most refutable evidence, that secretion alone takes place in the posterior chamber, and absorption only in the anterior chamber; and it has been urged in support of this opinion, that when the anterior chamber becomes obliterated by the intimate adhesion of the iris to the cornea, whilst the posterior chamber gradually enlarges, the accumulation of aqueous humor in the enlarged posterior chamber proves the fact, that secretion occurs in that part, and goes far to prove also, that absorption does not take place there, but in the anterior chamber. It will be perceived that this latter assumption involves an argument equally erroneous and unphilosophical, for upon this supposition we must imagine that the secreted fluid, when once deposited in the posterior chamber, not being removable in consequence of the obliteration of the anterior chamber, and, in consequence also (according to the hypothesis, the fallacy of which I am endeavouring to point out) of the want of an absorbent surface on the part of the cavity in which it is lodged, must remain during the life of the individual in whom this large accumulation of aqueous fluid takes place, unless, indeed, it be discharged by an aperture in the tunics of the eye; an assumption which is opposed to facts of the most obvious and unquestionable character; for it may be remarked that, in such cases—that is, cases in which the globe is unusually full and enlarged, in which the anterior chamber is obliterated, and the posterior chamber much augmented—absorption of the fluid contained in the globe and collapse of the eye-ball will sometimes take place. Although I acknowledge that no important argument on either side can be drawn from this state of things, as regards the *natural* functions of the part, I will just add, that if this view of the subject be correct—if it be indeed true that absorption alone takes place in the anterior and secretion alone in the posterior chamber—we must admit in the case in question one or other of the following very singular events; first, that when the posterior chamber has become filled to its fullest ex-

Treatment.—The treatment of staphyloma of the cornea may be either palliative or radical; the former comprising those measures which, whilst they retard or prevent its increase or lessen its volume, diminish or remove any pain it may occasion;—the second, including those means which remove the staphylomatous enlargement altogether or nearly so, or produce collapse of the eye-ball.

If staphyloma of the cornea be attended with any inflammation of the textures of the eye, you must have recourse to the antiphlogistic measures you would employ independently of the existence of the staphylomatous formation. If the patient be either so timid or so obstinate as to refuse to permit the excision of the staphyloma although it may be increasing and producing great irritation of the opposite organ, and is itself in a highly inflamed state, it would be right, first, to reduce the local inflammation by the employment of the particular measures suited to the seat and extent of such inflammation, and afterwards, to tap the eye with the fine grooved needle usually employed for that purpose, and this operation should be repeated as often as the contents of the globe re-accumulate in sufficient quantity to excite an irksome feeling of distention. Occasionally this mode of producing a mitigation of suffering actually becomes a

tent, secretion suddenly ceases; or, that, secondly, presuming it proceeds, the surrounding structures are mechanically stretched, extenuated, and compelled to yield to the pressure exerted from within, and this too, so slowly produced, that years are often required before it takes place to any considerable extent; and also without exciting any pain or uneasiness which can be distinctly and fairly referred to the agency of such a distending force. My space however will not permit me to consider this part of my subject so fully as I could have wished, or I could have adduced many arguments and experiments to show that neither the anterior nor posterior chamber possess exclusively the property of absorption, but that absorption and secretion takes place in both of them, in, as nearly as can be calculated, an equal degree with respect to a given extent of serous surface.

means of cure, the eye-ball collapsing and the staphylomatous tumour subsiding just as effectually as after the excision of the cornea; but this is an extremely rare occurrence, and it must not be expected that so favourable a result will be produced by this mode of treatment.* As to the situation at which the staphyloma should be punctured, that will be determined by circumstances, but I have usually selected for this purpose its most attenuated and prominent part. Counter-irritation may be combined with this evacuation of the contents of the staphyloma, if it be attended with much uneasiness of either organ, and the patient refuse to consent to the performance of an operation for its complete cure.

The seton was formerly employed—a small seton was passed through the base of the staphyloma, and, in some instances, the irritation it produced led to the collapse of the eye-ball; but it is a very slow, tedious, uncertain, and painful mode of cure. The application of caustic was strongly recommended by RICHTER, but it is not suited to very young subjects, on account of the extreme thickness of the cornea in very early life, and the consequent difficulty of destroying the whole of the corneal lamellæ, so as to penetrate the anterior chamber; for it is to the production of this effect upon the cornea, and to the accomplishment of which object, the application of the caustic is had recourse to, that we depend for the cure of the disease. Without mentioning the various kinds of caustic applications which have been recommended for this purpose, with the different modes of using them suggested generally by the original proposer of each par-

* The adoption of antiphlogistic measures, and the employment of counter-irritation will sometimes so far diminish the size of the staphylomatous enlargement that no further remedial measures may be required.

ticular description of caustic application, I shall proceed to explain the mode of practice I employed in two instances of this kind, to enable me to give an opinion respecting the value of this method of cure as compared with that by excision. Having worked a piece of lunar caustic to a very fine point, and directed an assistant to separate the lids without pressing upon the globe, I applied this pointed piece of caustic to the most projecting and attenuated part of the (conical) staphyloma, and retained it in contact with that part for little more than a minute, and before closing the lids, I passed a fine stream of warm water over the surface of the eye-ball; on the following day I repeated the caustic application, and in a few hours a small eschar appeared, and on its separation a minute circular aperture was formed, through which the aqueous humor was discharged. This aperture did not close for many days, and as soon as a thin film appeared and prevented the exit of the aqueous humor, I destroyed it with the point of a probe, and in this way maintained its occasional patency for many weeks, and thus by keeping the anterior part of the eye-ball in a flaccid state, the cornea shrunk, adapted itself to the diminished quantity of its contents, and the eye-ball became eventually as perfectly collapsed as though the entire cornea had been excised. In the other instance, and the only other instance in which I have attempted the cure of staphyloma of the cornea by the use of the caustic, I was not so fortunate; the formation of an aperture in the cornea had merely a palliative effect, and it became necessary in order to complete the cure to remove a part of that membrane by the usual operation. In both these cases, the nitrate of silver was applied to the most prominent part of the staphyloma only twice, at an interval of two days, and on each occasion it was retained in contact with the part

little more than a minute, but the duration of its application, and the number of times it may be necessary to repeat it, will vary in different instances.

I cannot recommend the double ligature for the cure of staphyloma, for it is a painful, tedious, and, in some instances, as regards its effects, an ineffectual mode of procedure. However, some surgeons even at the present day prefer the mode of cure to which I am now referring, that is, by passing a needle armed with a double thread through the base of the staphyloma, and tying the ligature above and below, thus including the whole of the staphylomatous cornea, and removing it partly by the cutting effect of the ligature and partly by inducing sloughing by strangulating its circulation.*

Scarpa and others recommend that a small portion only of the staphylomatous cornea be excised, and they assure us that very little pain attends the performance of this operation, that very little inflammation is produced by it, and that it is quite as efficient and certain, as a means of cure, as the excision of the entire cornea; and it is a modification of this method of Scarpa, which I have adopted in the operations I have recently performed for the radical cure of large staphyloma corneæ.†

Preparatory treatment.—Before an operation is performed you would deem it right to lower the plethoric by the administration of purgative medicine, and the use of an abstinent diet, and you would be careful to take away or diminish any local inflammation which may exist, by the application of leeches and of cooling lotions, and by

* This operation is described by Celsus, Banister, St. Yves, Heister, &c.

† See cases of staphyloma cured by operation in the second and third volumes of the *Provincial Medical and Surgical Association.*

the adoption of the ordinary means for removing ophthalmia; and it is of great consequence to put the health into a pretty good state before you undertake an operation of this kind, which may be succeeded by very acute and troublesome symptoms.

Description of the operation.—Having requested the patient to lie upon a table with the head a little raised, direct an assistant to separate and secure the lids without making any pressure upon the globe of the eye, then, with a pair of hooked forceps (held in the left hand) transfix the centre of the cornea, and taking a common triangular cataract knife in the right hand, pass it through the cornea (supposing the staphyloma to be of large size, and to involve the whole of the cornea) *midway between its centre and its margin*, on each side, and urge it forward until it "cuts its way out" at the distance from its margin I have just mentioned, then with a pair of curved scissors cut off the upper or lower flap, observing as nearly as possible the same directions with regard to the magnitude of the part excised, and the distance of the incision from the border of the cornea, as regulated your operations in making the lower incision. The portion removed will be about as large as the plane surface presented by a good sized split pea.* When the chambers of the eye are obliterated, the lens, (generally diminished in size) will be found situated immediately behind the cornea, and will be easily discharged with a small portion of the vitreous humor through the corneal opening; but in other in-

* It appears to me that the disease is cured not by the mere diminution produced by, and in correspondence with, the size of the part removed, but by the occurrence of atrophy as a consequence of the operation—the principle to be kept in view in the adoption of our remedial measures is, in fact, the production of atrophy without the extensive removal of parts by a surgical operation.

stances, where the anterior chamber only is obliterated, the posterior chamber being increased in size, and the capsule and lens retaining their proper situation, I should not advise their removal, because the eye-ball will then be of a moderate size, and the deformity will be much less than in those instances where it is in an extremely collapsed condition. And this is one reason why I prefer the removal of only a small portion of the cornea whilst operators generally, I believe, remove nearly the whole of the staphylomatous protuberance. By adopting the mode of operating I have now suggested, the crystalline lens and vitreous humor with the least prominent and diseased portion of the cornea are preserved, and the subsequent appearance of the organ is more agreeable than when a more considerable portion of the cornea has been taken away, and (as generally happens in such extensive excision of that tunic) the lens and a part of the vitreous humor discharged.

After the operation you had better wait a short time before you adjust the lids, and apply the bandage, for, in some instances, hæmorrhage occurs, the aperture left by the excised cornea is occupied by a clot of blood, which prevents the escape of that fluid which may be discharged into the cavity recently occupied by the lens, the aqueous and the vitreous humor, and the globe is so painfully distended that the patient will suffer the most agonizing torment. I well remember this fact, for many years ago I assisted a gentleman at an operation of this kind, who, in truth, excised, in the words of Celsus, a portion "ad lenticulæ magnitudinem;" the patient's eye was soon afterwards dressed and bandaged—comfortably bandaged, as we thought, but in a quarter of an hour or little more he was suffering the most frightful pain, which was instantly relieved by removing a clot of blood from the

aperture in the cornea, and discharging a quantity of fluid blood and other effused matters which had collected in the previously half emptied tunics, and been confined by the clot in front. This occurrence is of course the more likely to happen when the portion of cornea which is removed is very, and unusually, small in reference to the entire magnitude of the staphyloma.

After this operation is completed, and after having waited for a certain period, I adjust the lids, and apply over them a fold of linen dipped in cold water, and direct the patient to keep it continually moistened with water or with the lotio plumbi acetatis dilutus, and employ venesection, advise the application of leeches, recommend the administration of purgatives, and so on, just as circumstances may render necessary. And I may just mention by way of caution that although operations of this description are not frequently followed by much inflammation, yet in some few instances, inflammatory action is set up, and your utmost care will be required to prevent suppuration of the eye-ball, and the extension of inflammatory action to the brain. Preface an operation for staphyloma therefore by the adoption of every measure calculated to allay general irritation and to improve the health, enjoin an abstinent diet for a certain period after it has been performed, and watch carefully every symptom indicative of commencing inflammation.*

* A few days after an operation for staphyloma, the eye-ball is sometimes observed to be much enlarged, the eye-lids extremely swollen, the patient complains of dreadful pain and tension of the globe, and suffers from a degree of irritative fever. The application of leeches above the eye-brow, the use of poppy fomentation to the tumid part, the administration of purgative and anodyne medicine, combined with a lowered diet, have usually relieved these threatening symptoms in the course of a short period in those instances in which I have witnessed their occurrence.

After an operation for staphyloma it is right that the patient should

With regard to the process of reparation;—in the first place there is a new membrane formed, which is of a gelatinous consistence, and, if I may be allowed the term, semicorneal appearance, by degrees it acquires firmness, vascularity, and extreme opacity, and during the progress of cure it becomes in a great measure absorbed, and the surrounding cornea is drawn together and becomes attached to it, so that the cornea after this operation (performed in the mode I have previously explained) has a somewhat contracted and corrugated or puckered aspect, but retains its black colour, and its centre is generally either flattened, or slightly, but not materially, depressed. But if the whole or nearly the whole of the cornea has been removed, and the lens and a large quantity of the vitreous humor discharged, the eye-ball collapses, there is a pit in the centre of the little knob into which it has dwindled, and its surface is divided into two grooves, more or less distinctly marked, which cross each other in the centre of this remnant of the globe, and at each angle there exists a small button like prominence. In continuation of my observations on the process of reparation after an operation for the excision of the staphylomatous cornea I may state that the film or new tunic which forms, is produced by deposition from the divided edges of the cornea which deposition forms at first an inner circle, a sort of margin, to the wound in the cornea,

be kept as quiet as possible in those instances, where the lens has been left *in situ*, for any great exertion or sudden straining will be very likely to rupture the capsule and produce the displacement of the lens, and as an examination of the eye can be of no service, unless some untoward accident should arise, it is not necessary to remove the bandages and disturb the lids for two or three days after the operation; but, of course, if any great degree of pain arise, or any considerable tumefaction of the palpebræ, it will be proper to institute an examination with a view of ascertaining the cause of these events.

thereby diminishing the extent of the chasm, and deposition also takes place upon the surface of the coagulated effusions situated in front of the lens, which I am now supposing to retain its natural situation; and the organization of this deposition is one of the early steps in the reparative process. With respect to the mode in which these and similar depositions here and elsewhere acquire organization, whether vessels actually form in them, or merely elongate from neighbouring parts, and in what manner such elongation or new formation of vessels occurs, I must refer the reader to those authors,—and particularly to the works of HUNTER,* and WILSON,† and to those of PHILIP,‡ PARRY,§ BURNS,‖ THOMSON,¶ HASTINGS,** and JAMES,††—who have devoted much time and attention to the investigation of this interesting subject.

In those instances where collapse of the eye-ball has taken place, the patient may be anxious to wear an artificial eye, for the reception of which there will exist a very convenient cavity or surface. Such an eye is easily introduced by first raising the upper lid, and pushing it (the artificial eye) upwards, and afterwards depressing the lower lid, and introducing its inferior part. It is secured

* *A Treatise on the Blood, Inflammation, and Gun-shot wounds.* London, 1812.

† *Lectures on the Blood, and on the Anatomy, Physiology, and Surgical Pathology of the Vascular System.* London, 1819.

‡ *An experimental Inquiry into the Laws of the Vital Functions, &c.* London, 1818.

§ *Additional Experiments on the Arteries of warm-blooded Animals, &c.* London, 1819.

‖ *The Principles of Surgery,* London, 1831.

¶ *Lectures on Inflammation.* Edinburgh, 1813.

** *A Treatise on Inflammation of the mucous membrane of the Lungs, &c.* London, 1820.

†† *Observations on some of the general principles, and on the particular nature and treatment of the different species of inflammation.* London, 1832.

in its position by the palpebræ in front; it obeys the movements of the opposite organ from the sympathetic action of the muscles of the knob upon which the artificial eye is placed, and when well made cannot be distinguished from its fellow by cursory observation; indeed a surgeon informed me that he was very near prescribing a blister to be placed above the eye-brow of an artificial eye, instead of directing it to be applied over that of the real organ, which was amaurotic. Persons who wear an artificial eye generally remove it in the evening, wipe away any secretions which may be attached to it, and replace it in the morning.

The treatment of the partial staphyloma of the cornea will be so variable that I scarcely know in what manner to mention it. It is certain, however, that whatever may be its size, if it is the seat of inflammation, or the cause of ophthalmia, which is severe, obstinate in duration and frequently relapsing, and if the enlargement cannot be removed by milder measures, it ought to be taken away with the knife—its summit should, in fact, be excised.

SECTION XIII.—CONICAL CORNEA.*

The cornea is liable to certain changes of figure independently of any *material alteration in its texture*, and of these changes that in which the cornea acquires a conical form is by far the most frequent. However, conical cornea may exist in a slight degree, as a congenital

* The best representations of this disease with which I am familiar are to be found in WARDROP'S *Morbid Anatomy of the Human Eye*. Plate 9, Fig. 1; DEMOURS' *Traité des Maladies des Yeux* Planche 57, Fig. 1;—and MONTEATH'S translation of WELLER'S *Manual*, &c. Plate 2, Fig. 2—3.

disease, and, in such case, it does not usually undergo any subsequent alteration.

Now, in this affection, the cornea is elevated into a more or less obtuse cone. Its progress is slow and unattended with pain, there is no opacity present, nor any evidence of inflammation. When the eye is examined laterally, it appears as though a piece of glass of a conical figure were placed upon the centre of the front part of the eye, or, to adopt the comparison of LÉVEILLÉ, "il sembloit que la pointe de ce cône fût un peu moins transparente que le reste de la cornée."* It has an extremely brilliant appearance, owing to the reflexion of the light from its surface, and in those instances in which it is unusually prominent and pointed, there is an appearance produced as though a drop of very clear water were suspended from, or attached to, its apex. This beautifully clear, crystalline appearance of the cornea, and particularly of its apex, is so very peculiar that your attention will be at once arrested the first time it is presented to your notice, and it will never afterwards escape your attentive observation or be confounded with any other condition of disease to which the cornea is subject.

I have stated that the disease is very tardy in its progress, is not attended with pain, and that, with the exception of the peculiarity in the appearance of the cornea, as respects the alteration of its form and the brilliant reflexion of light from its surface, and also the increased capacity of the anterior chamber, it is not indicated by any visible change in any other part of the eye; but persons so circumstanced are always myopic, (that is, presuming the refracting powers of the other parts of the

* See his Translation of SCARPA's work *On the principal Diseases of the Eyes.* Vol. 2. p. 182.

eye are as usual) and this near-sightedness comes on gradually, it increases with the progression of the disease of which it is an effect, until, in the extremest stage of the affection, they are compelled not only to place any object they are desirous of examining close to the eye, but to arrange it on one side—to view it laterally—so as to avoid the most conical, and therefore most refracting, portion of the cornea.

The most prominent and pointed part of the conical cornea is not, however, always its most central point, for sometimes, although rarely, it is situated rather towards the nasal or temporal side of the eye, at all events it deviates from the precise centre in a greater or lesser degree.

With regard to the subjects in whom it occurs, the age at which it takes place, and the causes from which it arises, I have very little to remark. It does not appear to be peculiar to any age; it more frequently takes place in women than in men; it is extremely seldom noticed in very early life,* and occurs with equal rarity in very advanced age. Of course, it may exist in very old age, having originated at an earlier period of life, but I have never known it *commence* after the age of sixty. I do not know that it is especially associated with any particular employment, for it has occurred under my own observation, to farmers' labourers, to females, who have been accustomed to exercise their eyes much in fine sewing, and also to those, who, for very many years prior to its

* Mr. Wardrop says he has met with it in a boy eight years of age. *The morbid anatomy of the Human Eye.* Vol. I. p. 130.—Mr. Phipps remarks that "it is a change which sometimes takes place at the age of puberty; and when the cone is once complete, the disease seldom makes any further progress, or suffers any other change, than that the apex sometimes becomes opaque."

occurrence, have merely attended to their ordinary household avocations. Nor does it appear to result from any previous inflammation or injury to the eyes, for, in nearly every instance I have witnessed, the individuals so affected, have assured me that no such occurrence—that neither inflammation nor accidental violence—has recently preceded the change in the figure of the cornea.

The conical cornea when not congenital is evidently the result of a change effected in that tunic by the modifying and arranging powers of the absorbents;—it cannot be owing to inflammation of the cornea, nor to a preternatural fulness of the globe, for in either case the cornea would not long retain its transparency.*

Now, if we believe that the eye possesses its power of adaptation—its capacity to distinguish extremely proximate and distant objects—in consequence of the action of the ciliary ligament upon the margin of the cornea assisted by the agency of the recti muscles upon the globe, we can readily explain the phenomena connected with the formation of conical cornea. For if the ciliary ligament operates in the manner in which it has been presumed to operate, that is, by compressing the edge of the cornea, when the eye is intently engaged in the examination of very minute or extremely proximate objects, it would have the effect of increasing its natural convexity, and the influence of this condition of things when frequently permitted to exist, would, as I imagine, be likely to induce that change in the organic operations of the cornea which would be followed by the malady we are now considering.

* It has been stated to depend on an impulse of development existing in the part at the period of puberty, but this will not explain its occurrence before and after that period.

As this disease is attended with an increase in the quantity of the aqueous humor, it has been supposed that the pressure of that fluid may produce the attenuation of the cornea, and its consequent extension and projection, but surely it cannot be admitted that such an event would occur without exciting pain.* A sufficient amount of pressure upon the external tunics of the eye to produce their partial absorption must, as I imagine, occasion a degree of uneasiness, adequate at least to attract the patient's attention. And again, if an increase in the quantity of the aqueous humor occurred, and were proved to produce the absorption of the cornea by its pressure upon its neural surface, and that consequence of its attenuation, the formation of conical cornea, some change in its secreting membrane must have preceded such an occurrence, of which there is no evidence presented either by the patient's history of his feelings or by an attentive examination of the eye.

You will be desirous of knowing the actual state of the cornea and the anterior chamber during the development of the disease, and the effects it ultimately produces, not merely on vision but in the structure of the cornea, and you will also wish to ascertain if any alteration takes place in the contents of the globe of the eye. At the commencement of the affection, the cornea is rendered more prominent, but not by an equal elevation of its entire surface, for, even at this early period of the disease, its centre is more raised in proportion than its circumference. The aqueous humor exists in increased quantity and the anterior chamber is larger than usual, the pupil

* "Conical cornea is entirely owing to the size and form of the cornea, in consequence of an increased quantity of aqueous humor being contained in the anterior chamber of the eye." Lyal in *Edinburgh Medical and Surgical Journal.* Vol. vii., p. 10.

being natural in appearance and the iris not bulged forward but retaining its proper figure and situation, and being only more distant from the neural surface of the cornea in consequence of its newly acquired convexity. I cannot tell whether or not the cornea is, generally, at this stage, actually thinner or thicker than it is naturally,* nor whether its central part only is materially changed in these respects, nor can I state if any change has taken place in the interlamellar texture, for no opportunity of examining the cornea *at this stage* has occurred to me. As the disease advances the cornea becomes projected until, in many instances, its central part is elevated into a distinct point, the iris, unaffected in colour and mobility, becomes more and more distant from the cornea, and the anterior chamber is rendered proportionally more ample; but the external surface of the cornea is not a perfectly even projecting surface, as was first discovered by Dr. Brewster, but consists of a number of spherical eminences and circular depressions, which, possessing, according to their figure and their situation upon some particular part of the cornea, various degrees of refracting power, render the impression of objects broken, confused, and multiplied. But this confusion and multiplication of objects, produced by the particular inequality of the corneal surface to which I am now referring (and which can only be discovered by a person practised in the examination of minute bodies by means of powerful glasses) only occurs when objects are examined by the patient with the naked eye or by means of glasses of feeble power,

* "Among the causes producing short sight, is a morbid thickening of the transparent cornea, which has been usually termed conical cornea." Adams in *London Medical and Physical Journal*. Vol. 37, page 211

but when viewed through the medium of a proper double concave glass, the powerful effect of the glass upon the rays of light is not overcome or interfered with by the comparatively trifling and opposing agency of the slight elevations and depressions of the cornea.

I have said that the disease generally affects both eyes; it may not affect them equally and simultaneously, but very soon after this morbid change occurs in the cornea of one eye, it also takes place in that of the opposite organ, so that I can only call to mind, two instances, in which the disease *began* in one eye after the age of puberty, and proceeded to its usual extent, whilst the cornea of the other eye retained its natural figure.*

What are the effects of conical cornea upon the anterior chamber, and upon the contents of the globe? I have stated that the anterior chamber is enlarged, and the quantity of the aqueous humor increased, whilst the iris retains its colour, and its form, and preserves its mobility and its natural situation; but, when the cornea is partially ulcerated (ulceration of the apex of the conical cornea is not an infrequent occurrence at the latter stages of the disease,) or even before that event takes place; the straining

* I have had one opportunity of examining after death the state of the cornea, in a person who was affected with conical cornea in an extreme degree, and in that instance its laminæ were less moveable upon each other, its circumference was of a natural and ordinary degree of thickness, but its apex was much thinner than usual and rendered opaque on its exterior only, for its neural surface even at the apex was perfectly transparent; in other respects it did not appear to have undergone any change, unless I mention that alteration in the evenness and equality of its surface discovered by Dr. Brewster, but which was not visible to the naked eye. It is not my intention to represent this solitary case as conveying correct information respecting the morbid anatomy of conical cornea in general, but I am disposed to think that at the same stage of the disease as that at which I had an opportunity of making the examination in the case I have just detailed, the morbid changes in the *actual structure* of parts will be confined to the cornea, and will be such as I have now stated to exist.

efforts of the eye for the purpose of rendering objects distinctly visible, may rupture the anterior capsule, dislocate the lens, and force it against the neural surface of the iris, which will then be urged against the posterior surface of the cornea. I have never seen an instance in which the lens has been so displaced by the gradual yielding and extension of the capsule, and I presume that laceration of the capsule is necessary to permit the dislocation of the lens in the instance and in the situation to which I am now referring, unless indeed the lens and its capsule be detached at the same time. Sometimes the iris will bulge forward, will assume a convex appearance, without any appreciable change of position in the crystalline lens, but this constitutes an exception to the general rule.

Hitherto my remarks have applied to that conical condition of the cornea, comprising a disease involving its entire extent; but I have seen one instance of this affection occurring only very partially, for the conical portion of the cornea was only as large at its base as the plane surface of a small split pea; it existed at the lower part of the cornea, resembled a small and extremely conoidal portion of beautifully transparent glass placed upon the surface of the cornea, and occasioned great confusion of sight from the unequal refraction of the rays of light. The appearance of the disease was extremely singular, and exhibited the nature of the affection in a manner which could neither be mistaken nor misunderstood.

When conical cornea continues to increase and becomes very prominent, its apex is rendered opaque by the friction it sustains during the movements of the lids, for, in consequence of the projection it forms, the mucous surface of the upper palpebra does not adapt and apply itself to the whole anterior surface of the eye-ball, but is sustained

in a great measure by the summit of the cone formed by the projecting cornea, and kept at a distance from the surrounding part of that membrane. This is the first change; but if the disease increase, the extreme point of the conical cornea becomes much attenuated, still more exposed to the partial friction of the upper eye-lid in its motions upon the globe, until it ulcerates and leads to staphyloma.

Opacity ulceration and staphyloma constitute the usual morbid effects upon the corneal structure, resulting from the increasing projection of conical cornea.

Nearsightedness is sometimes a congenital defect; many children of the same parents are born with an unusually prominent cornea, and are obliged to wear glasses to correct the defect this state of the cornea induces, and such children I have in several instances known to be the subjects of decided conical cornea *(staphyloma corneæ pellucidum)* at a very early period of life.

Treatment.—Various constitutional and other remedies have been recommended for the cure of conical cornea. Mr. Travers says, he has "found repeated blisters, and the more powerful tonics, as steel or arsenic, decidedly serviceable." (292.) This plan I have tried, but in no instance has it arrested or removed the disease. Pressure has been recommended, but as the disease does not result from a mere yielding of the cornea, owing to an incapacity to resist the pressure of the contents of the globe, I am at a loss to conceive in what way it can act beneficially upon the disease, and as the effect of pressure externally applied will have the effect of promoting the absorption and ulceration of the point of the cone, I believe it to be so very mischievous that I must decidedly object to its employment.

Evacuation of the aqueous humor has also been culo-

gized,* but, as that fluid is soon re-produced, and as the affection of the cornea is totally independent, as respects the nature of its cause, of the increase of that secretion, I do not see how it is likely to act beneficially. A solution of alum, and of the nitrate of silver, and various astringents have had their period of trial and reputation; but, unless for the purpose of healing and arresting ulceration of the cornea, I do not know how they are likely to be serviceable; at all events, I am confident, that in my own practice those cases in which astringents have been employed have arrived at their full development quite as early as those where no such remedies have been used; however, where there exists any degree of opacity or ulceration, the use of the nitrate of silver drops is certainly advisable.

Mr. Travers says that the confusion of vision is much diminished by causing the patient to look through a small aperture in a frame of black wood about a quarter or half an inch in depth, but a gentleman who had an instrument of this description made at my recommendation for the purpose of assisting his vision, which was much confused from a conical state of both corneæ, assured me that it was less useful to him than the double concave glasses, and that I can readily imagine, for, whatever might be its beneficial influence in other respects, it could not prevent that confusion and multiplication of objects produced by that inequality of the surface of the cornea detected as I have mentioned by Dr. Brewster.

Sir W. Adams recommends the removal of the crystalline lens, as the best mode of permanently relieving the

* Dr. Lyal states that the evacuation of the aqueous humor was tried by himself and Mr. Gibson without advantage, but that four cases under the care of the latter gentleman were prevented from becoming worse by the frequent use of a solution of alum in water, and also of the decoction of oak bark.

defect of vision occasioned by the existence of conical cornea. When we come to investigate the subject closely we find that the plan of cure proposed by Sir William is merely calculated to relieve an effect, rather than to arrest the progress or procure the removal of the disease.* When a person is capable of seeing sufficiently well by the aid of concave glasses to continue his avocations he will be unwilling to submit to so serious an operation, (serious as regards his view of the matter) as that which the removal of the lens will involve, particularly when he knows that it will exercise no control over that morbid process upon which the conical cornea is dependent for its increase; and when the defect becomes more considerable, in consequence of the progress of the malady, when perhaps he may consent to its performance, the opaque and attenuated condition of the centre of the cornea, constitute such great objections to the performance of a surgical operation of this nature, that I think no judicious surgeon would at all events suggest it otherwise than as an experiment holding out the slightest possible chance of affording benefit; for what will be the result? if the opaque condition of the cornea be insufficient to destroy vision, the increase of the disease, (which this operation will *not* prevent) will lead to ulceration and

* It is right to mention that Sir W. Adams relates two cases in which the method he has proposed appears to have produced great benefit. In the first case, an old woman of seventy suffering from cataract and conical cornea of each eye, had nearly perfect vision restored by the removal of the cataracts. In the other case, a young woman was affected with conical cornea in an extreme degree, but the lens of each eye was *not* opaque. Sir William removed the lens from each eye by "causing them to be absorbed;" and he mentions, as the result of the operation, that she saw objects at a distance better without than with any glass he could procure, that indeed she neither used a glass for near or distant objects, and that she was able to return to her place of service and fulfil its duties.

staphyloma of the cornea. If after having explained these things to the patient at the commencement of the malady, he is willing to permit the removal of the lens as a means of securing him a more perfect degree of vision during the progress of the disease than he would otherwise possess, with the *chance* of its becoming stationary when it has arrived at a certain point, you would be fully justified in removing it. And this leads me to say a few words respecting the kind of operation it is advisable to perform under such circumstances, with a view of obtaining the removal of the crystalline lens, which in these cases I am presuming to be quite transparent; for, of course, if cataract were combined with conical cornea, there could be no reason for hesitating about the proper plan to be pursued—undoubtedly the opaque lens should then be removed without delay.

If conical cornea be present in a young or an adult person, you would perform the posterior operation of solution, for that I should much prefer to reclination or depression, without, however, wishing to deny that circumstances rendering the one or other more suitable, might exist. But, in persons more advanced in life, the operation of extraction is to be preferred, and you would be careful to make the incision of the cornea as near to its margin as possible. Future observation may determine how far the section of the cornea, in the operation of extraction, is capable of beneficially modifying that change in the organic relations of the part, upon which I believe conical cornea to depend.

I have now to explain the plan of treatment I am in the habit of adopting in these cases;—when the disease is in its incipient state, I advise that the eyes should not be much used in any way requiring *minute* vision, nor in any avocation demanding close and attentive vision for a long period. I also advise the patient to wear occa-

sionally when accurate vision is required, double concave glasses, adapted to the extent of the projection of the cornea, and to use the belladonna drops, whenever requiring for any especial purpose a better state of vision than ordinary, for, by enlarging the pupil, you permit the transmission of light through that part of the cornea which possesses the least degree of refracting power. At a more advanced stage it becomes still more necessary to insist upon the propriety of abstaining from all avocations requiring close and attentive vision, and to wear the more deeply concave glasses as little as possible; and you will generally secure to your patient an improved degree of eye-sight by directing the daily use of the nitrate of silver drops in the proportion of two or three grains to the ounce of water, whenever the cornea is rendered opaque or whenever it becomes ulcerated at its summit.

I have very lately had occasion to evacuate the aqueous humor in a case of this description, in consequence of great pain and tension of the eye-ball, and certainly under similar circumstances and with a view of *relieving local uneasiness*, such practice may be adopted.

Where the point of the conical cornea has become opaque, and vision is thereby rendered much more obscure than it would otherwise be, it has been proposed to make an artificial pupil near to the margin of the cornea which it is said will have two important advantages; namely, removing the pupil from the opaque part of the cornea, and allowing the light to be transmitted through the least convex part of that membrane.

In one or two cases which have recently been under my care I have derived some advantage from the frequent administration of emetics, as recommended by Mr. Guthrie, but with my limited experience of their influ-

ence, I am scarcely prepared to advocate their claims to the notice of the profession from a strong and decided conviction of their utility.

It will be remembered that this is one of those diseases which are extremely slow in their progress, and that it may exist many years before it arrives at its full development, and that after having made a certain degree of progress, it may remain stationary for a long time, and, in some instances, will not further increase.*

SECTION XIV.—FUNGOID AND OTHER TUMOURS OF THE CORNEA.

Congenital growths from the cornea are sometimes noticed, and Mr. Wardrop, Mr. Gibson, Dr. Baron, and others, have described enlargements of this description. They are generally of a firm white texture, and a few hairs grow from their centre, which are almost always of the same colour as the hair in other situations, and are first noticed at the period of puberty.† I have

* I have in one or two instances witnessed a disease much resembling the conical cornea, except that, instead of assuming a conoidal figure, the cornea has acquired a globular form—it has been projected externally so as to form the segment of a perfect sphere. The same transparency of texture was remarkable, but the cornea did not seem so bright and sparkling as in the conical change, nor was there any degree of opacity upon its surface. Vision was so much confused as to afford little more than a capacity to discern vivid colours, and to distinguish objects placed almost in contact with the eye. In these cases I proposed to remove a portion of the cornea at the lower part, and then to unite the edges of the divided cornea, with a view of lessening its sphericity, but my patients were unwilling to submit to the operation, and of course it afforded but a very trifling chance of much improving vision.

† This description of congenital growth from the cornea is represented with amazing fidelity by Mr. Wardrop. (Plate 4. Fig. 1.) The first figure of plate 64, in the work of Demours gives an equally correct idea of the kind of tumour to which I am referring, as far as the size

seen two cases of this kind, one of them is related in the second volume of the *Midland Reporter*, the other fell under my observation lately, and occurred in the eye of a girl (— Robathan residing at Lench-street) rather more than twelve years old. It was about as large as the half of a small split pea, smooth, of a dirty-white colour, and firm texture, and of a convex figure externally, and apparently covered by the conjunctiva. It was situated partly upon the sclerotica and partly upon the cornea, and her mother told me the child was born with the mark upon the eye, which she accounted for in the usual manner.

Various other growths are stated to arise from the cornea by old authors, but of these many appear to be too marvellous to be accurate. Mr. Travers states that he has removed a peculiar fungous growth interstitial to the conjunctiva and cornea;* and he has represented the part after removal in the second plate of his work.

SECTION XV.—INJURIES OF THE CORNEA.

I have previously stated that some escharotic substances when applied for a sufficient length of time produce an

and figure and surface of the enlargement are concerned. Irregular and more extensive growths from the cornea—growths of a reddish tuberculated appearance— are also delineated in the preceding works. Tumours of the cornea are also described by Richter, Beer, and Himley. Gazelles (*Journal de Médecine. T.* 24.) relates a case in which a hair grew from the cornea, which was re-produced as often as it was extracted; and Mr. Wardrop mentions a case in which "a thick tuft of black hair grew from one-third of the cornea in the eye of an ox." Fischer speaks of a condition of disease in which a horny growth arose from the cornea in consequence of a wound of that part; and Clemens has given an engraving of a disease which he thus describes:—"Speciem oculi bovis exhibet, ubi e corneæ medio excrescentia cornea protuberat."

* *A Synopsis of the Diseases of the Eye, and their treatment.* London, 1824, page 402.

immediate change in the corneal texture, which change is generally succeeded either by permanent opacity, ulceration, or sloughing; lime, for instance, effects an alteration in the cornea producing opacity and shrivelling of its texture, and the same effect is produced by the application of heat. I should state that one effect of lime upon the corneal texture is to destroy its lamellar qualities; when the cornea is so injured, its layers do not move upon each other, but they are in fact consolidated, and constitute one dense membrane of a more compact character than that of the natural and healthy cornea.

The cornea may be injured by contusions, which require of course the same treatment as the disease which the accident may have excited, whether it be inflammation or rupture of the cornea, or effusion of blood or deposition of lymph between its lamellæ. Division of its substance, such as lacerated or incised wounds, are usually complicated with other mischief and gives rise to acute inflammation of other parts. The application of belladonna to the eye-brow in those instances where prolapse of the iris is present or is likely to be produced, and the institution of the treatment adapted to the removal of the inflammation the injury may have excited, will comprehend the treatment such accidents require; and, in the progress of the case, the employment of those measures which are calculated to limit the magnitude of staphyloma if it has arisen, or prevent its occurrence if it merely appears likely to be produced, will be advisable. I shall speak of the union of the cornea—the mode in which it heals and unites after it has been divided—in the course of my remarks on the operation for the extraction of cataract.

Lodgment of a foreign body upon the cornea or within its substance.—If a particle of metal or any other hard substance be attached to the surface of the cornea, you

may easily remove it by means of the eyed extremity of a probe, and this will be more easily effected if, when you have directed the patient to look in a favourable direction for the purpose, you were then to fix the eye with a speculum, or you may accomplish this object by pressing upon the eye-ball by merely allowing the fingers to advance a little beyond the tarsal margin.

When the foreign body is more deeply impacted, you would attempt its removal by first fixing the eye in a proper position, and afterwards endeavouring to dislodge it by means of a needle such as is used for the operation of keratonyxis, except that it should be worked to a blunt point; for, if a very fine-pointed and sharp instrument be used its point may be too weak to sustain the force it may be necessary to employ, and will besides be applied with more difficulty, and will be likely to become entangled in the texture of the cornea.

But the foreign substance may have penetrated the cornea so deeply that in the event of your dislodging it there will be a risk of the escape of the aqueous humor, and the subsequent adhesion of the iris. In such cases it would be better to suffer the foreign particle to remain, to allow it to become detached and to fall into the anterior chamber; for, in these instances, before the foreign body falls into the anterior chamber, deposition on its exterior will have occluded the opening which its entrance produced, and which, when the foreign particle has penetrated far, would remain open and cause the discharge of the aqueous humor if it were removed as soon as, or soon after, the occurrence of the accident. I am now supposing that the foreign particle is of small size, and does not project externally so as to excite much irritation, for, if it does so project, it had better be removed by a pair of fine forceps, rather than permit the hazard of the occur-

rence of that severe degree of inflammation, its continuance would, under such circumstances, be likely to produce.

Sometimes persons will permit a foreign body, (and such foreign bodies are generally of a metallic nature) to remain in the cornea until it has excited a most mischievous degree of corneitis and iritis, and when you attentively examine the eye you will find that the particle is surrounded by a dark coloured groove, and that it is only retained in its situation by some very trivial attachments, and when in this state the slightest touch is sufficient to effect its removal. You will understand that when a foreign particle is imbedded in the cornea, it produces severe inflammation of that tunic, and affords one of the best examples of acute corneitis; and you will also remark, that that part of the cornea which is in immediate contact with the foreign body at the time it penetrated that tunic, becomes afterwards removed by absorption, a groove is formed around it, the corneal substance is removed from behind, until the foreign body is completely detached. Nothing is more easy than the removal of a foreign body from the cornea when a groove is formed around it; but, of course, it should always be taken away as soon as possible without waiting for the formation of this groove, except in the instance of deep penetration of the corneal substance, when its *immediate* removal, or any attempt at accomplishing its removal, would endanger the evacuation of the aqueous humor, and the subsequent prolapse of the iris.

Sometimes after particles of metal are removed from the cornea, an *appearance* pretty much as though it were still present, will remain, and people will often ask you to remove *something* from the eye which is really *nothing* more than a brownish stain of the cornea produced by the

prolonged residence of a particle of metal upon its surface or within its texture. Of course no attempt should be made to take this stain away with an instrument—it will almost always disappear without the assistance of any local applications whatever.

Small grains of gun-powder, when driven against the cornea, sometimes penetrate so superficially that they may be picked out with a cataract needle, and when this can be effected, and without inflicting much pain or injury, it ought to be done.

As regards the inflammation, and other effects, both immediate and remote, resulting from the accidents to which the cornea is liable, I may state that there is, in fact, no treatment proper for inflammation, opacity, ulcer, or staphyloma of the cornea, arising from, or consequent on, local injury, except as the general treatment of the same diseases proceeding from other causes.

SECTION XVI.—OSSIFICATION AND VARIOUS CHANGES IN THE TEXTURE OF THE CORNEA.

Sometimes ossific matter is deposited upon the surface of the cornea, or its lamellar texture is converted into bone, or a thin plate of bone or particles of ossific matter are found between the laminæ. I have seen all these occurrences in my own practice, although ossification of the cornea is admitted to be a rare disease. I have seen it in gouty and rheumatic individuals, and after local injury. WARDROP,* CLEMENS,† and LAWRENCE,‡ have

* *The Morbid Anatomy of the Human Eye.* London, 1834. Vol. 1, page 74.

† *Scriptores Ophthalmologici Minores.* Lipsia, 1826. Vol. 1, p. 140.

‡ *A Treatise on the Diseases of the Eye.* London, 1833, page 661.

collected many cases of this description from the works of various authors, but, I apprehend, we are only able to learn from their recital that every texture of the cornea may become ossified, and that bony matter may be deposited upon and between any of them.

The corneal texture is sometimes thickened and rendered tough; ANGELY says he has sometimes met with it as hard as a piece of moist cartilage, and HIMLEY states that he has found it quite tendinous.

These and various changes in the thickness, consistence, and other characters of the corneal texture take place and some of them have been recorded, but it will be remarked that they occur but very seldom.

SECTION XVII.—IMPERFECT AND EXCESSIVE DEVELOPMENT OF THE CORNEA.

I have seen the cornea imperfect at its margin, it has appeared at some part of its edge as though the sclerotica had encroached upon or rather superseded it. Sometimes it is atrophied from disease or without any clearly defined cause; a case of this description is represented by DEMOURS.* The following extract from a paper I have recently published in the third volume of the *Provincial Medical and Surgical Association*, contains all the information I am capable of communicating from my own observation respecting the slight and excessive development of the cornea. "When the cornea is small from birth it usually happens that the other parts of the eye exist in a correspondingly diminished size; but I have

* *Traité des Maladies des Yeux*. Planche 61, fig. 2.

lately seen two instances in which the cornea was scarcely at all developed; the other parts of the eye being, apparently, perfectly formed; I have also seen two examples of undue development of the cornea. The first of these examples is thus referred to in my printed *Introductory Lecture.* 'I have lately seen a young man from Bloxwich, suffering from a most extraordinary development of the left cornea; though retaining the most perfect transparency, it is increased to nearly treble its natural size, the iris has augmented in a corresponding degree, so that the anterior chamber is amazingly ample. The other parts of the eye are not at all enlarged. But the fact to which I am desirous of directing your particular attention is the occurrence of the same disease in the opposite cornea. When I first saw this person, the right cornea was not at all enlarged, but it is now evidently increasing, and will soon, I fear, become as large as the other, at least unless something be done to prevent it.'

"In the second example the disease occurred after small-pox, in an infant, a patient of my friend Mr. Palmer, who requested me to see the—*Case.* The right eye is quite healthy. The cornea of the left eye is much increased in extent, its diameter being at least twice as great as that of the opposite cornea. Its texture is apparently healthy and quite transparent; the anterior chamber is very ample and the iris is placed at a considerable distance from the neural surface of the cornea. The humors of the eye are somewhat cloudy.—If the left cornea continue to increase in size, and if a morbidly increased development occur in the opposite cornea, which the use of iodine and mercury and the employment of counter-irritation fail to arrest, I shall recommend, from experience of its utility in such cases, the removal

of a central portion of the much enlarged cornea, as a means of preventing the loss of vision of the eye last affected. This is the only mode of destroying the sympathy which exists between these parts, under this condition of disease, with which I am acquainted."

Various defects and irregularities connected with the development of the cornea are pointed out in the recent work of Dr. Seiler.*

* *Beobachtungen ursprunglicher Bildungsfehler und Gaenzlichlen Mangels der Augen, bei Menschen, und Thieren.* Dresden.

CHAPTER IV.

DISEASES OF THE SCLEROTICA.

Preliminary Observations.—Although the diseases of the sclerotica are not very numerous, it is very apt to participate in the inflammatory condition of other parts, and chiefly so from the circumstance of contiguity. On this account we frequently find the sclerotica inflamed in conjunction with, and in consequence of, the previous existence of inflammation in the conjunctiva, the cornea, the iris, and the choroid, but there will be no difficulty in distinguishing the primitive inflammation—an inflammation originally arising in a part from local or constitutional causes—from a secondary inflammation, that is, an inflammation arising from the extension of morbid action. The compound inflammations which this extension of morbid action produces are not usually established when the original disease is early witnessed and judiciously treated.

The sclerotica is a firm fibrous tunic, not possessing in its *healthy state* much sensibility, not very richly organized, and incapable of much extension by any *suddenly applied* force; hence you will discover the source of the extreme pain connected with those forms of acute inflammation to which it is subject, and of the torture produced by the sudden increase of the contents of the globe from inflammation of its tunics. The sclerotica is thicker and stronger behind than in front, and is thinnest immediately around the margin of the cornea, which is the part where

it generally yields in the disease termed staphyloma; and it is pierced by numerous holes for the transmission of the ciliary vessels.*

The sclerotica does not participate in *many* of the constitutional affections of the system, and the diseases to which it is most obnoxious are, inflammation—attenuation—staphyloma—and ossification.

Now inflammation of the sclerotica occurring in strumous subjects is sometimes modified by the strumous diathesis; for instance, its duration is more protracted, it is attended with more intolerance of light and lachrymation than simple sclerotitis, and will be most promptly cured by those remedies which we have on a former occasion stated to be peculiarly applicable to many instances of scrofulous inflammation of the eye; at all events, as the symptoms will be rendered less acute by the existence of this constitutional predisposition, bleeding, and the other antiphlogistic remedies will be less frequently required.

The sclerotica is not unfrequently affected with rheumatic inflammation, and though sometimes rendered irritable during the existence of gonorrhœa and syphilis, is never, as far as I am aware, conjoined with any venereal affection in such a way, as to justify the apellation of *syphilitic sclerotitis.*

The sclerotica possesses powers of reparation commensurate with its grade of organization, which powers of

* For further information respecting the anatomy of the sclerotic coat the reader may consult the following works:—*Descriptio anatomica oculi humani iconibus illustrata*; auctore JOHANNE GOTTFRIED ZINN. page 1.—*A Treatise on the Eye, the manner and phenomena of vision;* by WILLIAM PORTERFIELD, M. D. Vol. i, page 138.—*A Description of the Human Eye*; by JOSEPH WARNER, F. R. S. page 58.—*Traité d'anatomie descriptive;* par XAV. BICHAT. Tom. ii, page 429.—*The Morbid Anatomy of the Human Eye*; by JAMES WARDROP. Vol. ii, page 252.

reparation are fully competent to effect the union of incisions and lacerations of its texture of considerable extent, if the part be, previously to the injury, in a healthy state and the constitutional vigour be unimpaired.

There are certain means of distinguishing inflammation of the conjunctiva from that of the sclerotica, which, with a view of preventing any interruption in my description of the symptoms and characters of sclerotic inflammation, I shall now point out.—Inflammation of the conjunctiva is very generally attended with an increased secretion of mucous, purulent, or muco-purulent fluid, which is discharged from its surface, but which, as the sclerotica is covered by other parts, never happens in *pure* sclerotic inflammation; the former (conjunctivitis) is attended with a pricking smarting sensation, a sensation also as though gravel or sand were interposed between the lids and eye-ball, which is generally limited to the eye itself, and is nearly equally severe so long as the inflammation continues; whilst the latter, (inflammation of the sclerotica) is characterized by a throbbing pulsating pain deep in the orbit, and by acute pain in the eye-brow, cheek, temple, the side of the nose, or the entire side of the head and face, which is for the most part of a periodical character, remitting in severity or being totally absent during the day, and returning with great intensity towards evening. In inflammation of the conjunctiva, the enlarged vessels are arranged upon that tunic in a diffuse anastomotic manner, and are most numerous at the periphery of the globe, they are capable of being moved *upon* the sclerotica, and follow any forced alteration of position (with respect to the eye-ball) of the conjunctiva, they are of a bright scarlet tint, of large size, and project from the surface of the conjunctiva. The vessels, in inflammation of the sclerotica, pass in a nearly parallel direction, with

respect to each other, towards the margin of the cornea, upon which oftentimes they extend for a short distance, and around which they are very numerous and form a delicate plexus; they obey the motions of the eye-ball, and always move with the sclerotica; they are also of a deep pink, and in some instances of a livid colour; they are generally of a small size, do not ramify at all diffusely (except around the margin of the cornea) but pass in a direction almost parallel as regards each other; they are deep-seated compared with those of the conjunctiva, and do not project from the surface of the eye-ball. The trunks of the few vessels which pass to form the plexus are of considerable size.

SECTION I.—SIMPLE ACUTE INFLAMMATION OF THE SCLEROTICA.

Under the term simple acute sclerotitis, it is my intention to describe that form of sclerotic inflammation which is neither produced by, nor has any necessary connexion with, rheumatism.

Characters of the inflammation.—Simple inflammation of the sclerotica is characterized, at its onset, by an imperfect and not very distinct arrangement of pink vessels around the margin of the cornea, a few large trunks only being visible at the periphery of the globe, accompanied by two or three smaller ones from the upper and lower and the lateral parts of the eye-ball. They are at first very small, and of a pink appearance, by degrees they increase in size, the vessels first observed being joined by many others which pass towards the corneal margin, their colour being still of a pink, and at their fullest development, of a livid tint. It will be remarked that these

vessels do not anastomose and ramify at all freely towards the periphery of the globe, but pass nearly in a parallel direction without giving off any or only very few branches, until they approach the cornea, when they more freely anastomose and form a wreath or zone, more or less distinct and perfect, around its margin; and at this period it will be noticed that a few of the conjunctival vessels enlarge, and that the conjunctiva is more vascular than usual, at least a few of its vessels acquire an increase of size, and we may then very clearly perceive the difference in the magnitude, situation, arrangement, and colour, between the conjunctival and the sclerotic vessels.

The iris will sometimes participate in the inflammation of the sclerotica, and when such participation occurs, the combination of symptoms so produced will be clearly intimated by an aggravation of all the symptoms with which simple inflammation of its texture is attended. This addition to the inflammation of the sclerotica will of course render that zonular arrangement of vessels around the circumference of the cornea (which, when the sclerotica alone is affected, is always very slight and imperfect,) as distinct and complete as in any form of iritic inflammation which has proceeded to an equal extent independently of the previous existence of acute sclerotitis; but in the disease which forms the subject of my present observations, it will be noticed that the sclerotic vessels actually pass quite to the margin of the cornea, and frequently proceed upon its surface for a short distance, whereas in *mere* iritis, there is a white ring between the zone of vessels situated upon and within the texture of the sclerotica and the margin of the cornea—a ring of white healthy sclerotica about a quarter of a line in breadth interposed between the zone of vessels and the border of the cornea.

In mentioning the existence of a slight and imperfect

zonular arrangement of vessels around the cornea, as one of the local indications, one of the constant characters of fully developed sclerotitis, I ought to mention that at this part there exists a peculiarly intimate vascular connexion between the conjunctiva, the cornea, the sclerotica, and the iris, and that it is scarcely possible for the sclerotica to be inflamed in its extremest degree without leading to the formation of this vascular zone.

Bichat has clearly pointed out that fibrous membranes in general do not possess any great extent of capillary ramification, and this anatomical peculiarity affords another explanation of the trifling degree of visible vascularity which is observed when the sclerotica alone is inflamed. Unquestionably, the sclerotica is subject to a slow disorganizing inflammation which is not prominently characterized by that degree of enlargement and that abundant ramification of minute vessels, which so generally occurs in many other textures when the seat of inflammation.

The preceding observations will be found to comprehend symptoms of inflammation of the sclerotica, as relates to its vascularity, whether confined to its own texture or extending, from the circumstance of contiguity, to surrounding parts.

The intolerance of light and the lachrymation are not very great at the commencement of sclerotitis, but in its maturest stage, when the inflammatory action is considerable, the patient will suffer from exposure of the organ to an ordinary degree of light, and will also be annoyed with pretty profuse lachrymation. However, many circumstances will modify the extent to which these symptoms may be developed in particular cases, independently of the existence of any given amount of inflammation, such, for instance, as the state of the individual's health prior to the occurrence of inflammation in the eye;

his constitutional susceptibility; the existence of a strumous diathesis, and so on.

The pain in sclerotic inflammation is most severe, and of an acute, throbbing, pulsating character; the firm texture of the sclerotica will not permit the enlargement of its vessels, at least in the sudden manner which the increased *vis a tergo* requires, and the pain is, in consequence, of the most grave and tormenting description. Perhaps indeed there is no texture of the eye, which, possessing *naturally* so little sensibility as the sclerotica, when inflamed gives rise to so much torment, and as it is not very highly organized, I have attributed this extraordinary intensity of suffering to the slowness with which its texture yields to the disposition to enlargement of its vessels, many of which do not ramify upon its surface but pass into, and are diffused through, its substance. I have attended many persons suffering from this disease, who perhaps, prior to my seeing them had either permitted the affection to proceed without any interference, or been attended by some one who had neglected the adoption of those active measures which are so generally and promptly required, and who have complained of a burning sensation of the eye-ball, and a feeling as though the globe of the eye were too large for its socket, a sensation however quite different, as they will explain, from that uneasiness which arises from the distention of the eye-ball owing to a sudden increase of its contents (as occurs in some instances of inflammation of the septa of the vitreous and the membrane of the aqueous humor) and unless free depletive measures are adopted, this pain and uneasiness will proceed to a most distracting extent.

The inflammation of the sclerotica sometimes extends to the cellular membrane upon its external surface, which produces a slight degree of subconjunctival œdema, so

that, in some examples of sclerotitis, the eye has a watery appearance, and the conjunctiva is a little raised from the part beneath pretty much as it is in erysipelatous ophthalmia.

Now this disease may advance and involve other textures, constituting, according to the degree of its extension, either ophthalmitis, or inflammation of some particular part in addition to the sclerotica.

You will imagine that with symptoms such as those I have just mentioned, that is, with acute inflammation of the sclerotica in its worst and most severe form, perhaps extension of inflammatory action to deep-seated parts attended with acute local pain, there would be some constitutional disturbance, and such in fact is the case, but its degree varies; it may be so considerable as to constitute general feverish excitement, or irritative fever, or it may be merely that trivial and unimportant systemic derangement which is the necessary concomitant of any local disease attended with severe pain. The head is occasionally very painful, but not so frequently so by any means, as in rheumatic sclerotitis, there is some degree of hemicrania, and sometimes a severe degree of facial neuralgia limited to that side of the face corresponding to the inflamed eye.

Simple acute sclerotitis most commonly occurs at adult or at the middle period of life, particularly in the strong, plethoric and robust, and may be produced by many of the ordinary causes of ophthalmia in general. Its severest forms are not usually the product of local injury; in many of the instances of sclerotitis in its worst forms, which I have witnessed, it was not produced by any local injury, and in other cases where the sclerotica has been wounded or the eye-ball contused by accidental violence, the symptoms of sclerotitis have been by no means severe. Of

course it may be induced by the extension of inflammatory action from other parts, or it may arise from the same circumstances which determine a similar inflammatory condition of other textures of the eye; as, for example, in those instances where from some local source of irritation or defect of the constitution, or derangement of the health, the whole of the textures of the eye assume simultaneously an inflammatory action, and form that severe state of disease, termed *ophthalmitis.*

If inflammation of the sclerotica be very severe and long continued, it may lead to alteration of its structure, which may terminate in staphyloma, and this is most apt to occur at that part of it immediately around the cornea where the sclerotica is naturally thinnest, and you will often notice a bluish appearance in this situation, which, in these cases, can only arise from attenuation, by which the black texture beneath (the choroid) is rendered partially visible. You may have an opportunity of convincing yourselves of this fact, for, if you will carefully examine the fibrous tunic of an eye in which this appearance has been noticed during life, you will perceive that the sclerotica has absolutely become thinner at that part immediately around the cornea, that its structure is firmer and more compact at that part, and that, when it is removed from surrounding membranes, its colour is as white as usual.* Again, by the extension of inflammatory action, leading either to the establishment of compound ophthal-

* A slight degree of sclerotitis is apt to impair its white glistening appearance—to render it of a comparatively dull dirty-white colour. SCHREIBER speaks of the "concretio choroideæ cum sclerotica," which I have ascertained to exist only in a few instances where the inflammatory action has extended to the choroid coat, so that I so far agree with him in placing this pathological change among the occasional effects of choroiditis.

mia or ophthalmitis, those changes in vision and upon the structure of parts will be effected, which the same variety and degree of inflammation would be likely to produce independently of the previous existence of sclerotitis. Lastly, although acute sclerotitis is generally very manageable, very easily diminished and subdued when unassociated, as its cause, with any constitutional affection, yet, it often leaves the eye in a weak state, and very susceptible of assuming active inflammation from very trivial causes—from causes totally inadequate to its production in its natural and healthy condition. The vessels of the sclerotica when much (I speak in reference to their limited capacity of distention in this texture) and for a long time distended, seem for a certain period afterwards unable to contract to their original dimensions, and remain enlarged by reason of the nature of the structure in which they are situated, and the injury their tonicity has sustained by the strength of the impulse required to force them into a state of distention, in a structure so dense, firm, and compact, as that of the sclerotica.

The causes of simple acute sclerotic inflammation are chiefly, local injury, and exposure to cold or to those circumstances which determine an especial quantity of blood, and produce an increased activity of circulation in the eye or the head; causes, which, in the general, produce other ophthalmic affections, and which, in those instances where they lead to sclerotitis, are usually determined in regard to the seat of their operation, by some local defect or a peculiar aptitude for the reception of the morbid action.

It is desirable to discriminate as accurately as possible *simple acute* from *rheumatic* sclerotitis, which is characterized by a less degree of intensity of the local inflammation, which occurs in rheumatic subjects, which frequently

alternates with other rheumatic affections, or occurs on their subsidence, which is distinguished by a yellowish or yellowish-brown tinge of the sclerotica, and the pain of which is remittent and is never confined to the eye alone, and generally occurs during the night and scarcely at all from sunrise to sunset.

Treatment.—Free depletion with the lancet, is in this disease the remedy most prompt in its action, general in its application, and valuable in its effects. The amount of local pain, the strength of the patient, and the degree of the inflammation will of course determine the extent to which the abstraction of blood ought to be carried; but, with a due regard to the influence of these circumstances, you may bleed very freely, not merely with a view of preventing the extension of inflammatory action, but with the intention of preventing the establishment of that chronic form of disease which the prolonged distention of the sclerotic vessels too often causes.

If the patient be not in a condition to bear free general depletion, or if after the first bleeding the symptoms are merely slightly relieved, whilst the powers of the system are inadequate to sustain a repetition of the venesection, you may direct the application of leeches to the lower eye-lid. Of course free bleeding becomes increasedly advisable when the iris or the choroid are involved in the inflammatory mischief. If you have an opportunity of witnessing a case of sclerotitis, occurring in a strong plethoric subject, at its early stage, it depends in a great measure on the kind of practice you may adopt whether the eye remain permanently weak and seriously injured or recover without the slightest defect.

Purgatives.—Purgatives are also of great value, for this is a disease the cure of which mainly depends on the prompt employment of measures calculated to lower the

power and vigour of the circulating system. You may administer one or two ample and active doses of calomel and jalap, and afterwards prescribe saline purgatives. Mercury given to the production of, and for the purpose of producing its specific effect is not necessary—the disease is much better treated without the induction of salivation. Small doses of tartarized antimony, with the compound extract of colocynth, may be given to maintain the free action of the bowels, in those instances where saline purgatives are not suited to the constitutional or other circumstances of the patient; but I really do not see the necessity of administering colchicum and digitalis and so on, for the purpose of lowering the powers of the system, when that object can be so much better effected by the means I have already pointed out, and I am convinced that many practitioners who have relied upon the administration of nauseants and sedatives, to the exclusion of general bleeding, have much prolonged the management of the disease, and have often been obliged to adopt that treatment eventually with which they should have commenced.

Counter-irritation in some convenient situation, such as the temples, the back of the neck, or behind the ears, will often be necessary when the acute symptoms have been removed by previous depletion, but before bleeding has been premised it can only be mischievous.

Local applications.—At the commencement and during the full development of an active and acute inflammation of this description, local applications cannot be of much service, and applied, as they too frequently are, in a cold state, must be very injurious; however, they are in great repute with the public, and as they will, when judiciously selected and properly used, sometimes moderate pain, it may be as well to comply with a custom so uninjurious in

itself, provided it be not permitted to interfere with, or supersede the adoption of, more active measures. You may then direct the patient to bathe the eyes very frequently with a little warm goulard water, or if there be much pain and irritation, with a weak aqueous solution of opium, of the extract of belladonna, or of hyoscyamus, or a decoction of poppy-heads. At all events do not prescribe stimulating lotions, nor permit any lotions whatever to be applied in a cold state. In the secondary stage of the disease, (if it occurs) or rather in that state of the eye in which the sclerotic vessels remain enlarged, independently of the existence of any active or acute inflammation, and the eye continues very weak and irritable and susceptible of acute inflammation from very trivial causes, you may use slightly stimulating lotions, such as the zinc collyrium in the proportion of five or six grains of the sulphate to the half-pint of water, or a weak solution of the nitrate of silver, and afterwards the vinum opii; but remedies of this description must be used with caution, their strength accurately graduated by their effects, and they must be omitted whenever any tendency to the return of severe inflammatory action be evinced in consequence of their employment. Without the assistance of these local applications at the latter stage of the disease, particularly when the inflammation has been unusually severe and prolonged, or not treated with sufficient activity and promptitude, the sclerotic vessels will be a very considerable time in re-assuming their original dimensions.

Some surgeons recommend sudorifics and the warm bath, in almost every form of ophthalmic inflammation, but without wishing to decry their merits or deny their value, I may state that they are too unimportant to deserve any elaborate notice as remedies for the disease under consideration. The circumstances determining the pro-

priety of their adoption are of the same character in whatever form of ophthalmia they may occur, but as they rarely exist in acute sclerotitis, and are very frequently present in strumous affections of the eye, they are mentioned particularly only among the remedies for the relief of the latter class of ophthalmic diseases.

If you have reason to believe that the inflammation of the sclerotica is modified by scrofula, if for instance, inflammation of the sclerotica take place in a strumous subject, and if the disease be partial—exist only in patches—or be characterized by a less degree of inflammation with more intolerance of light than usual, you would of course be less energetic in your treatment as regards bleeding, and although I do not mean to say that the abstraction of blood would *not* be required under such circumstances, I am prepared to declare that it is necessary only to a *less extent*, and that the administration of tonics and the assiduous application of counter-irritation, must form, in the general, the second part of the treatment for the cure of this modified form of sclerotitis—that is, the treatment of the second stage of the disease, the acute symptoms having been previously diminished by venesection and purgatives. When the sclerotica becomes affected with strumous inflammation, it is for the most part in consequence of its contiguity to other textures which are affected with scrofulous inflammation. Fibrous membranes are very rarely indeed affected with primary scrofulous inflammation, and in this respect, the sclerotica strictly retains the pathological peculiarities of the class of membranes to which it belongs.

I should mention that the slight and chronic inflammatory affections of the sclerotica will require the same description of treatment as its acute forms, only in a less active degree; counter-irritation is more serviceable, bleed-

ing is less generally necessary, and local applications are more requisite in the slight and chronic than in the acute variety of sclerotitis.

SECTION II.—RHEUMATIC INFLAMMATION OF THE SCLEROTICA.

This is the most frequently occurring disease to which the sclerotica is subject; it is essentially of a rheumatic nature, and is frequently coexistent or vicarious with rheumatic inflammation in other parts.

The rheumatic inflammation of the sclerotica differs from simple inflammation of that tunic in many particulars: —It is almost always less acute and more tedious; the degree of vascularity is much slighter; the subconjunctival œdema more considerable, and the sclerotica acquires a yellowish or yellowish-brown tinge. The arrangement and colour of the vessels is however pretty much the same in both; they almost all pass from the periphery of the globe towards the cornea, around the circumference of which they are arranged in a somewhat zonular manner; their colour is also in both cases of a deep pink or of a livid tint. As in the former instance, although from the anatomical structure of the part the blood-vessels are most numerous around the cornea, yet many of them proceed to, or even upon, its margin; they do not terminate anterior to its edge, but actually pass a little distance beyond it. Thus then there is an obvious difference between the full, distinct, and complete vascular wreath which is seen at a little distance from the margin of the cornea in acute iritis, and that trivial arrangement of vessels which is noticed in the same situation in acute

sclerotitis, and which arises from the enlargement of those vessels which constitute the vascular connexion subsisting between the external and internal tunics of the eye, in that situation.

The pain of which the patient complains is generally most severe during the night, and is either absent altogether or present only to a very trivial extent during the day, and is not confined solely to the eye-ball, but extends to the orbit (the periosteal lining of which is presumed to participate in the inflammatory action) the eye-brow, the cheek, and the side of the nose, and, in some instances, the whole side of the head and face are affected with severe pains of a remittent character, and this more particularly during the night, the patient being quite free from uneasiness during the day, so that the unfortunate object of this tormenting disease is wearied by want of rest and exhausted by the persecuting intensity of the pain.

I had intended to supply some statistical statements in reference to the particular season of the year at which rheumatic sclerotitis most frequently occurs, and to furnish some precise information with regard to the following points:—1, the comparative frequency of its occurrence in conjunction with rheumatic inflammation of some other part;—2, the frequency of its occurrence from metastatic influence;—and 3, the comparative frequency of its occurrence independently of the former or present existence of a rheumatic affection in any other situation; but the paper which contains these statements, founded on my personal observation, is mislaid, and I am therefore compelled to quote from memory. Rheumatic sclerotitis takes place *most commonly* independently of the present existence of any rheumatic affection, but *not* independently of the former existence of rheumatism; and in very many instances it would seem to be vicarious of rheumatic

inflammation elsewhere, for although rheumatism in some other part of the body, *may have been* somewhat severe at the time of its occurrence, its severity has declined as the disease in the eye has progressed, and when *fully established* in that organ, it has wholly disappeared in its original site. I have known a severe attack of rheumatic sclerotitis supervene upon an acute rheumatic affection elsewhere, and continue in both situations with great severity, but this is very unusual and presents a rare exception to the general rule upon this point. In other instances rheumatic sclerotitis has distinctly alternated with rheumatism in some other part, the one texture resuming, or, to use a familiar phrase, taking up the action the other texture had declined.

Rheumatic sclerotitis occurs generally in the winter season, and is confined to no particular period of life between very early and extremely old age, but takes place most frequently, certainly most frequently, about or a little after the middle period of life. It rarely attacks both eyes at once; it possesses a strong tendency to relapse, so that when once a person has suffered from one attack he may expect future visitations of the same malady, and ought therefore to be attentive to prophylactic measures on the subsidence of any particular attack.

Although I have stated that rheumatic sclerotitis is attended with the most acute suffering during the night, yet I have in one or two instances known the reverse of this take place, and the patient has been grievously tormented during the day, and quite at ease the whole of the night; and the instances to which I now refer were so emphatically marked with the characters of rheumatic sclerotitis in other respects, that I could not readily be mistaken in my diagnosis. However, with regard to the pain *generally*, although it may have been

absent during the day, it returns with extreme severity towards evening, and, in many instances, the periods or paroxysms of its greatest intensity are regular in their occurrence—they take place at some particular hour and disappear with equal regularity.

It is not, as an *essential* character of the disease, necessary that vision should be much impaired, nor that there should exist any great degree of intolerantia lucis, or increased lachrymation, but these occurrences may constitute a part of the symptoms, and whenever the cornea and iris are involved in the mischief, (which is not unusual when the disease is prolonged and severe, particularly when it has occurred on many former occasions) vision will be impaired. Again—other parts may be involved, and it may be necessary to vary the treatment, in accordance with the particular complication of disease this *extension of morbid action* may have produced.*

Now, with rheumatic sclerotitis there is often great constitutional disturbance, much thirst, feverishness, and general febrile excitement in its various forms and degrees, which will be in proportion to the extent and extension of the local inflammation, and in each particular case you will take these symptoms into consideration in connexion with the local malady, when deciding upon the plan of treatment you may judge it necessary to adopt.

* I have in distinct remembrance several well-marked instances of that transference of diseased action, so well described by Mr. Lawrence, in which rheumatic pains of the limbs, discharge from the urethra, and rheumatic inflammation of the sclerotica succeeded each other with the most perfect regularity, the affection of one of these parts not generally arising at the *mere declension* but on *the total subsidence* of that in the other. This discharge from the urethra, arising independently of gonorrhœal contagion, is not however peculiar to rheumatic subjects, for persons affected with gout—persons of a gouty constitution—are occasionally troubled with puriform or gleety discharge from the urethra.

Effects of rheumatic sclerotitis.—Rheumatic inflammation of the sclerotica may lead to iritis and its effects, and to glaucoma; it may induce inflammation of the deep-seated textures, and it may also cause staphyloma and attenuation of the sclerotic substance; and to this statement of the modes in which rheumatic sclerotitis may terminate, I am disposed to add, some change in the texture of the sclerotica, by which, without any visible attenuation, it is rendered less capable of resisting pressure from within—less resistant—than when in a state of health. I have had reason to believe that the sclerotic texture is, on the other hand, occasionally indurated, and I have witnessed one instance in which ossific deposition occurred in the sclerotica after repeated attacks of rheumatic sclerotitis in an aged person.

Causes.—Rheumatic inflammation of the eye is usually produced (when not occasioned by what is termed metastasis or change in the situation of rheumatic inflammation,) by exposure to cold or damp in its various forms. However, independently of the partial application of cold to the surface, sudden changes in the state and temperature of the atmosphere; the removal from a warm crowded apartment into the cold, damp, evening air; exposing the body to sudden chills when heated by exercise, and particularly when in a state of free perspiration—constitute very frequently the immediately exciting causes of rheumatic sclerotitis.

Treatment.—In entering upon the consideration of the proper treatment of rheumatic sclerotitis, constitutional remedies must occupy an important share of attention. As I have already stated not only will the local symptoms of rheumatic sclerotitis vary, but the constitutional symptoms with which it is attended will also differ, and chiefly so in regard to their degree; so that any plan of treatment

I may recommend for its cure must be understood as being subject to those variations and modifications which the circumstances I have just alluded to, and others I might have mentioned, may render necessary.

Bleeding.—Bleeding is sometimes requisite as a first measure, but it is neither so frequently required, nor required to so great an extent, as in simple acute sclerotitis; but having made this admission I am by no means prepared to accede to the opinions of Mr. Wardrop upon this subject.*

Mr. Wardrop objects most decidedly to bleeding in rheumatic sclerotitis, and only permits it to be employed to a limited extent, when the use of other remedies has not been attended with relief; but you will perceive that this practice is, if I may be allowed the expression, permitting a disease to arrive at a certain degree of severity, in order that you may have an opportunity of curing it by active treatment. Surely you had better *prevent* the extension of the diseased action by prompt depletion (the necessity for which and the extent to which it should be carried, will be determined by the severity of the symptoms) rather than incur the hazard of arresting and curing it or otherwise, when it has so extended. Mr. Wardrop would appear to place great confidence in the evacuation of the aqueous humor in these cases. Now, increase in the quantity of the aqueous humor can only arise in the disease under consideration, from the progression of morbid action to parts which are not affected in the pure rheumatic inflammation of the sclerotica simply, and without denying that relief may be obtained in those forms of ophthalmia in which the aqueous humor is supera-

* *Medico-Chirurgical Transactions.* Vol. 10.

bundant, I am far from being willing to admit that such a mode of practice is at all frequently applicable, and by no means disposed to recommend it to be employed in the place of those active measures which the diseases producing this effect so generally require. As a means of palliating suffering, it may be occasionally resorted to with advantage.

Purgatives.—Purgatives will also be necessary, and particularly at the *commencement* of almost any plan of treatment it may be deemed advisable to pursue.

Having bled the patient, if that measure be deemed requisite, and relaxed the bowels, let me advise you to administer the vinum colchici in a dose varying from twenty drops to a drachm two or three times a day to be taken in a little liquorice tea, and to prescribe two or three grains of calomel with ten or twelve of Dover's powder to be taken every night at bed time.

The carbonate of iron has been very successfully prescribed in some instances which I have witnessed, and if you are foiled in your attempts to relieve and cure by means of venesection and colchicum, I would recommend you to try it, beginning with half a drachm to be taken three or four times daily. Used after venesection has been practised, in those cases which are attended with much neuralgia, it will often be found exceedingly useful. If the muscles of the eye-ball are at the same time affected with rheumatic inflammation, (as indicated by their spasmodic action, and by the severe pain experienced in the movements of the eye ball,) the colchicum, or the guaicum, ought to be administered.

Mr. Wardrop, who decries bleeding in rheumatic ophthalmia, and who also objects to the administration of mercury (which when the inflammatory action is extending to the deep-seated textures, is, in my opinion, absolutely

necessary to prevent the loss of vision) strongly recommends the administration of bark, but my experience does not enable me to agree with that excellent pathologist upon this point; on the contrary, I feel confident, that if, acceding to his practice as the general rule, you omit bleeding, the administration of calomel and opium, or colchicum, as circumstances may determine, and substitute for these measures the bark or quinine, you will very often have to regret your unfortunate choice. Where the rheumatic inflammation is confined to the sclerotica, in persons who are *thoroughly rheumatic* in the ordinary acceptation of that term, and who have recently been suffering from rheumatism in other parts, the colchicum is very decidedly preferable to calomel and opium given to the production of ptyalism, but in other instances where the inflammation is not confined to the sclerotica, but has evidently extended to the iris and cornea, the calomel and opium should be given with the same freedom as in simple acute iritis, and where the nocturnal pain is acute calomel and Dover's powder is to be preferred. However, if there be present much general disturbance of the health and great feverish excitement it might interfere with the practice now recommended, and might indeed be so severe as to render necessary the adoption of some specific plan of treatment for its removal.

The administration of tonics, particularly the sulphate of quina, may be required either during convalescence in instances where very active treatment has been necessary, or in the chronic forms of the disease, or, when the malady occurs in a worn-out emaciated constitution.

Counter-irritation.—A seton at the back of the neck, an issue in the arm, or a blister applied, and kept discharging, in some situation near to the eye, will often assist recovery, and will be very proper adjuvants to any

plan of treatment that may be adopted, particularly when great pain in the head and neuralgia of the face and around the orbit are associated with the morbid condition of the eye.

All local applications should be warmed before they are used, and it is usually found that some tepid anodyne fomentation is productive of great relief:—poppy fomentations, and the aqueous solution of opium and belladonna, are among the best of these local remedies.

When the iris is affected, and in all cases where the supra-orbitary nerve is especially painful, it would be advisable to smear the extract of belladonna above and upon the eye-brow, or to rub into and upon that part, a little of the mercurial ointment blended with a grain of opium, and to make use of one or other of these applications daily, or more frequently, so long as the inflammatory condition of the iris or the intense pain above the eye-brow may remain. You may also use the vinum opii or the nitrate of silver drops, to lessen that enlargement of vessels, which sometimes remains after the more acute symptoms of this and the former variety of sclerotic inflammation, are subdued. Where you have reason to believe that the inflammatory condition of the eye is owing to a sudden suppression of the function of the skin when in a free state of perspiration, or to continued chilliness of the surface, it would be right to recommend, in addition to sudorific medicines, the use of a warm bath every evening.

To enumerate some of the various remedial agents, to be employed for the cure of rheumatic sclerotitis, and to speak of them in the order of their importance and the frequency of their applicability, I may mention—1, bleeding;—2, calomel and opium;—3, colchicum or guaicum;—4, calomel and Dover's powder, and the use

of the warm bath;—5, tonics;—6, purgatives;—7, counter-irritants;—8, anadoyne fomentations, and various tepid lotions; and lastly, the application of the extract of belladonna, or the infriction of the mercurial ointment, blended with opium, upon the skin immediately above the eye-brow, and as the pain generally occurs towards evening, it would be advisable to rub the mercurial ointment, containing a grain of opium, over the situation of the supra-orbitary nerve about two hours before going to bed, or at least before the pain is expected to take place, and to repeat the application in about four hours if relief be not obtained.*

SECTION III.—STAPHYLOMA OF THE SCLEROTICA.

Although many writers on ophthalmic maladies have omitted to mention that particular enlargement of the sclerotica which constitutes staphyloma, yet it would be improper to omit this affection in a *Treatise* professing to comprehend the whole of the diseases of the eye. It is true that staphyloma of the sclerotica is an extremely rare disease on account of the strength and firmness of its texture, which will not readily admit those interstitial depositions which so frequently occur from a variety of causes between the lamellæ of the cornea; and also on account of its indisposition to accept the ulcerative pro-

* I have lately had an opportunity of seeing a person (John Harlow) who had suffered from a state of most acute rheumatic sclerotitis, and who had fruitlessly tried the effect of bleeding—of calomel and opium—of quinine—of the carbonate of iron, &c. but who was very rapidly amended and almost cured by the vinum colchici, although at the time he commenced its use, the cornea was quite opaque and as red as a piece of scarlet cloth, and its margin surrounded by a densely red ring, formed by a series of enlarged vessels.

cess;—certainly these are two very important reasons why the sclerotica so seldom becomes staphylomatous, compared with the frequency with which staphyloma takes place in the cornea. These observations apply to the sclerotica generally, but it will be remarked that that part of the sclerotica which covers the posterior portion of the eye-ball is much firmer, stronger, and thicker, than that portion of it which is situated towards the anterior part of the eye-ball, so that all other circumstances, with the exception of this anatomical fact, being equal, staphyloma of the anterior part of the sclerotica would occur much more frequently than at its posterior part, from any adequate cause producing an equal degree of pressure upon every part of its concave surface. If staphyloma of the posterior part of the sclerotica were an event of frequent occurrence, it would be often attended with most mischievous consequences as respects surrounding parts.

When speaking of staphyloma of the cornea, and describing its various causes, I particularly alluded to ulceration and interlamellar deposition, and in the present instance I have referred to the absence of these morbid conditions, as explanatory to a certain extent of the comparative rareness of staphyloma scleroticæ, but I ought also to have mentioned that the sclerotica is much less frequently the seat of inflammation than the cornea, and is therefore so much the less liable to any morbid change of texture dependent on inflammation for its production.

The forms of staphyloma scleroticæ I have generally witnessed are, an irregular bulging of that tunic around the cornea, either limited or general, either confined to a small spot or extending around the whole of the cornea; and this may arise independently of the existence of staphyloma cornæ, although that portion of sclerotica immediately around a staphylomatous cornea, will occa-

sionally merge into it and constitute its base, and at the same time materially increase its magnitude. I know that SCARPA says that he never witnessed an instance of staphyloma of the sclerotica at its anterior part, whilst he mentions two cases in which that membrane was projected into a considerable tumour at its posterior part just at the external side of the optic nerve. The engravings which accompany LÉVEILLÉ's translation of SCARPA's work, show that the staphylomatous enlargement of the sclerotiæ is of considerable magnitude, and pretty much of the same form in each of them. This is a very rare occurrence, I have seen nothing like it as a morbid process unconnected with local injury, but sections and laceration of the sclerotica sometimes give rise to staphyloma, and staphylomatous projections so caused may be witnessed at almost any and every part of that membrane. There may be a staphyloma of the sclerotica from division of its substance at almost any part of that membrane, and it may be either limited to the immediate site of the injury, or it may be so extensive as to implicate a great part of its texture, giving rise to an enlargement of the eye-ball somewhat resembling hydrophthalmia, except that the sclerotic portion of the globe will not be equally but irregularly enlarged.

On account of the great variation in the form and magnitude of these staphylomatous projections, we cannot arrange them as we arranged the varieties of staphyloma of the cornea; indeed it may happen that many of these staphylomatous enlargements will be present at the same time, giving rise to a nodulated surface, and when this occurs with much attenuation of the sclerotic substance, so that the choroid is pretty distinctly seen through it, the unequally prominent and dark-coloured tumours so formed, have, according to MR. TRAVERS, led surgeons

to mistake it for some malignant disease. I apprehend such mistake would not be likely to be made by any *surgeon*, who, on account of professional knowledge and attainment, is entitled to the name.

Having stated why staphyloma of the sclerotica is a disease of infrequent occurrence compared with staphyloma of the cornea, (the formation of small-pox pustules on the cornea, and its greater liability to accidents and local injury, &c. may be mentioned as additional reasons) having pointed out the usual situation in which it appears, and having referred to local injury as explanatory of its occasional occurrence at the postero-lateral parts of the globe, as contrasted with its more usual site when caused by some morbid process, I shall proceed to speak of its causes.

In the first place, staphyloma of the sclerotica may be produced by attenuation or impaired firmness of its substance resulting from inflammation; secondly, by division of its texture; and thirdly, by pressure from within. We are furnished with abundant proof that inflammation of the sclerotica renders that membrane less resistant than it ought to be, and in many instances leads to its attenuation, and, as the greatest amount of inflammatory action always exists in sclerotitis at that part of it immediately around the cornea, we at once perceive why staphyloma so much more commonly takes place in that situation than in any other. Again, the sclerotica sometimes forms the base of what was originally a staphyloma of the cornea; not that its *healthy* structure yields to the pressure from within, but because the sclerotica has either degenerated in its resisting properties, by the existence of chronic inflammation induced by the irritation of the staphyloma of the cornea, and because its texture having thus become attenuated, yields to the pressure of the contents of the globe which are so frequently, and so particularly propelled against

the anterior part of its paries by the spasmodic action of the recti and oblique muscles, which spasmodic action constitutes a part of that general irritability pervading, under such circumstances, the muscular apparatus of the eye and its appendages. The last and perhaps the most frequent cause of staphyloma of the sclerotica to which I shall particularly refer, is inflammation and enlargement of the vessels of the choroid. When we enter upon the consideration of choroiditis, I shall explain that a discoloration of the sclerotica is one of the symptoms by which its developed and latter stages are distinguished; and, as the inquiry is so intimately connected with my present subject, I may as well revert to the cause of this appearance. Surely it will not be said that inflammation of the choroid renders that texture so intensely black, or so modifies its colour that it may be partially seen through the healthy and unchanged sclerotica. Nor can it with truth be said that the texture of the sclerotica itself becomes tinged of a brown or dark colour, for, an examination of the sclerotica, when opportunities occur, will convince to the contrary.

When choroiditis has existed for some time (and it is frequently undetected at its commencement) the vessels of that membrane undergo considerable enlargement, for, the texture in which they ramify not being capable of rendering that support or offering that resistance which a firmer structure would afford, is peculiarly favourable for permitting a great augmentation in the magnitude of its vessels, so that when once they have become much enlarged and are allowed to remain distended for a certain season, no measures which may then be adopted will enable them to resume their original dimensions; it will very often happen that the vessels of the choroid will remain permanently enlarged and varicose. Now, what is the effect of

this condition of things upon the sclerotica? The pressure of the enlarged choroid vessels upon the sclerotica induces its absorption, it becomes attenuated and eventually yields to the pressure of its contents. But this staphylomatous bulging will not always occupy the same situation (which when iritis is combined with inflammation of the choroid, will be usually at its anterior part and immediately around the cornea) but as choroid varices frequently occur as a consequence of choroiditis, and that to a considerable extent, and as they vary in situation, so the staphyloma of the sclerotica will correspond to the situation of the varicose enlargement, so that it may be merely a trivial and very circumscribed bulging when thus produced, or, when excited by that more extensive attenuation of the sclerotica consequent on the continuance of severe choroiditis in which its whole vascular system is much increased in volume, it may be a pretty extensive staphylomatous projection. Of course, staphyloma of the sclerotica consequent on choroiditis will more generally take place at its front part than at any other, because the sclerotica is at the same time in a state of slight inflammation, and such inflammation would necessarily occur chiefly around the circumference of the cornea; and, if the iris be also inflamed, the greatest amount of vascularity of the sclerotica will be just around the corneal margin, and the sclerotica in this situation will be thus subjected to two causes—two circumstances—calculated to promote its attenuation and extension. Varicose enlargement of the choroid vessels cannot be deemed inadequate to produce absorption of the sclerotica, for preparations may be seen in which they form tumours as large as small peas.

There may be sometimes remarked a bluish appearance of the sclerotica immediately around the cornea after long continued or repeated attacks of iritis, and in some in-

stances, that part will be distinctly projected ever afterwards; this then affords further evidence that an inflammatory affection of the sclerotica leads to staphyloma and presents an additional explanation of the greater comparative frequency of its occurrence at its anterior part.

I have had an opportunity of examining one or two eyes in which staphyloma of the sclerotica was present, and in the first of these cases the staphyloma was large and dark-coloured at its base, but was not discoloured at its apex; the sclerotica was in this instance somewhat attenuated, but not, as in the case mentioned by Scarpa, so thin as "scarcely to equal the thickness of writing paper;" the choroid was extended upon its interior at its base, but was apparently, as well as the retina, absorbed at that part, which if it had existed would have lined its apex and all that part intervening between its apex and its base. In the second instance, several of the small staphylomatous projections existed, presenting during life a graduated series of dark-coloured nodules, the smallest being equal in size to a small pea, and the largest, to that of a small nut, which I suppose is the description of case referred to by Mr. Travers, as being sometimes mistaken for a more important malignant disease. In this case the choroid and retina were accurately and perfectly applied to their interior, and the sclerotica was somewhat attenuated, but not, otherwise altered, being neither looser nor more compact than when in its natural and healthy condition. Thus then the dark-coloured appearance presented in *some varieties* of staphyloma, and the absence of that tawny hue in other varieties, would not unfrequently depend on the absorption or laceration of the choroid in the large staphyloma, and its adaptation to the interior of the sclerotica in the small nodulated form of staphyloma.

Vision is always more or less impaired in staphyloma of

the sclerotica; it may be only slightly impaired or wholly destroyed according as the staphyloma may be large or small, according to the situation of the morbid enlargement, and the extent to which it may be connected with other diseased changes in the eye.

Treatment.—This disease rarely acquires sufficient magnitude to render its removal by an operation necessary, but if in any case its size should be so considerable as to excite a great deal of uneasiness, that operation would be unquestionably called for. I have never performed an operation expressly for the purpose of removing a staphyloma of the sclerotica, although in the first few instances in which I operated for conical staphyloma of the cornea, I excised not merely the whole cornea but also the surrounding portion of the sclerotica. There exists no reason, as respects the anatomical structure of the part, why an incision of its texture should be followed by any specially mischievous consequences.

Without entering further upon the probable consequences of an operation, I may mention, that independently of the employment of counter-irritation, and various astringent applications, and the adoption of such constitutional treatment as particular circumstances may render necessary, with a view of retarding or preventing the increase, or of palliating the evils occasioned by the existence of staphyloma of the sclerotica, the observations I have made upon this part of the treatment, may be included in, *first*, tapping the eye-ball; and *secondly*, removing the staphylomatous enlargement by the knife. The former of these measures would be preferable where the disease was extending, the sclerotica becoming more and more attenuated, and the patient suffering severely from distention of the globe, or from the pressure of the staphyloma upon surrounding parts; and the operation may be performed

by passing a grooved needle or an iris knife into the most prominent and attenuated part of the tumor. With regard to the other operation—that, for its entire removal—I have only to remark that the operation should be performed in the same way, securing the lids, but without pressing upon the globe, and arranging the patient as though about to operate for staphyloma of the cornea, and in order to steady the eye, it would be desirable to transfix the staphyloma with the hooked forceps. If the staphyloma be rather large, you would be careful to remove only a portion of it, for I believe you would gain all you require, at a much less hazard of producing unpleasant occurrences, by removing only a portion of the staphylomatous projection than by excising the whole.

Staphyloma of the cornea frequently acquires a large size so as to push forward the eye-lids very considerably, and being situated in front of and constituting the most prominent part of the eye, is exposed to and sustains a great part of the friction of the lids in its movements upon the eye-ball, which movements differ widely from that easy motion which takes place in the healthy and properly adapted state of these parts, and on this account—for the relief and removal of the uneasiness connected with this condition of things alone—an operation is often required for the removal of conical staphyloma of the cornea. But staphyloma of the sclerotica, on the contrary, rarely acquires a large size, and very seldom indeed projects much beyond the natural level of the cornea, so as to interfere with the free and proper movements of the palpebræ upon the surface of the eye.

Such then are the more ordinary diseases of the sclerotica and the modes of relieving or removing them, and I have only to mention that the other pathological con-

ditions of the sclerotica—nearly all of which consist in certain changes in the consistence of its texture, such as softening, hardening, ossification, and so on—are by no means frequently produced, and unless they depend on some inflammatory or similar process, we are rarely able either to cure them or to prevent them from increasing.

I have several times noticed a congenital defect of the sclerotica in which that membrane is projected into a tumour, which is usually situated at or near to the margin of the cornea. Sometimes hairs are seen to grow from its surface, usually from a small depression in its centre; these hairs do not appear until the period of puberty, they are short and strong, and possess, for the most part, the same curve or inclination and the same colour as the eyelashes.

CHAPTER V.

DISEASES OF THE MEMBRANE OF THE AQUEOUS HUMOR.

Preliminary Observations.—Hitherto we have had the advantage of treating only of those diseases which are rendered comparatively distinct, by the superficial situation of the parts in which they occur, but in the class of morbid affections in the investigation of which we are now about to engage, we shall not receive such assistance by the aid of vision by any means to the same extent.

The inflammatory affections of the external tunics of the eye are generally very manageable by treatment, may be detected before they have proceeded to their full development, and do not, unless exceedingly severe and obstinate, or much neglected, or inefficiently or improperly treated, leave behind any effects materially detrimental to vision; but the inflammatory diseases of the internal tunics sometimes take place so insidiously—they are not rendered evident to the patient by much external redness —that they are permitted to become fully developed before they receive medical attention. And, moreover, a degree of inflammation which, when occurring in the sclerotica or conjunctiva does not leave behind any morbid effects capable of interrupting the accuracy of vision, may and very often will, when it takes place in the iris, the choroid or the retina, lead to serious impairment of vision. Such are a few of the reasons which render it

perhaps more necessary to study the diseases of the internal membranes of the eye with attention, than those of its external tunics.

I have mentioned on a former occasion that the innermost lamina of the cornea is lined by a serous membrane, and I may complete my observations on the structure and anatomical relations of this membrane by stating that it is also extended upon the anterior and posterior surface of the iris, and is thence reflected upon, and very intimately associated with, the anterior hemisphere of the capsule of the lens. It is a delicate and transparent membrane of the serous class, and secretes and contains a limpid fluid called the aqueous humor. This fluid occupies the space between the anterior capsule of the lens and the neural surface of the cornea, and is figuratively said to exist in two chambers; that portion of it which exists in the space between the neural surface of the cornea and the corneal surface of the iris, is said to be contained in the anterior chamber, and that which exists between the neural surface of the iris and the iritic aspect of the crystalline capsule, is said to be contained in the posterior chamber. This arbitrary division is so frequently referred to, especially in treating of the operative surgery connected with cataract, that I have thought it right to mention so particularly, this otherwise not very important fact. The aqueous humor possesses powerfully solvent properties, so that particles of metal and other hard substances are readily influenced by its solvent powers and are subsequently absorbed—absorbed by the active absorbent surface of the membrane of the aqueous humor.

SECTION I.—SIMPLE INFLAMMATION OF THE MEMBRANE OF THE AQUEOUS HUMOR.

Having identified the membrane of the aqueous humor with the class of serous membranes in general, it is necessary to observe that like them it is subject to inflammation, and is not very liable to other morbid affections; at least I am not aware that it is particularly prone to other forms of primitive disease. Inflammation of so delicate a membrane as that of the aqueous humor, is not indicated by much external redness, and is indeed so liable to be confounded with iritis and corneitis, that some surgeons who have attempted to describe it have actually presented their readers with a description of a morbid affection, which, if it could be said to apply to any disease, must be considered as applying either to inflammation of the cornea or inflammation of the iris. Indeed, nothing but the closest attention can qualify any one to form an accurate diagnosis respecting inflammation of the membrane of the aqueous humor.

Inflammation of the membrane of the aqueous humor is generally characterized by a slight and very imperfect arrangement of pink-coloured vessels around the cornea, with a variable degree of enlargement of a greater or lesser number of the sclerotic and conjunctival vessels. I do not know that you can distinguish any difference in the *arrangement* of the visible blood-vessels of the eyeball in a case of *incipient* iritis and one of *fully developed* inflammation of the membrane of the aqueous humor; in both instances there is a narrow line of healthy sclerotica between the vascular zone and the margin of the cornea, and the vessels which constitute this vascular zone, are, in both instances, marked by the characters I have pre-

viously pointed out. But the aqueous humor itself becomes turbid, the cornea appears cloudy, and the brilliancy of the iris is diminished. The cornea also appears prominent—peculiarly and evidently prominent—the patient complains of a feeling of distention of the eye-ball, and of acute pain in the fore and back part of the head. Vision also is impaired, there is slight increase of the lachrymal secretion, but very little or no intolerance of light.

When you examine the eye carefully you will be able to distinguish with accuracy the cloudiness of the cornea from the turbidity of the aqueous humor. You will perceive that the cloudiness of the cornea is not seated superficially, as respects its own texture, and you will also remark that it is not equally diffused over every part of its lining membrane; there will indeed be a *general haziness* of that part, but in some situations, there will be a *distinct opacity* surrounded by a fainter circle or striated mark of a less opaque character; an appearance which has been aptly compared by Mr. Wardrop to "the eye of a pebble." This mottled and unequally opaque state of the neural surface of the cornea, or rather of the serous membrane which lines it, is one of the most distinguishing characters of the disease under consideration, and is distinctly referable to the effusion of some inflammatory product into the texture or upon the surface of the serous membrane, but the more decided and definite opacity to which we have referred, and which must not be confounded with the generally clouded surface, is presumed to depend on the extension of inflammatory action to the neighbouring substance—the actual lamellar structure—of the cornea. In addition to the generally turbid cloudy state of the aqueous humor, shreds and portions of lymph are seen to be floating in it during the sudden movements

of the eye or the head, and if the inflammation be severe and long continued, a thin delicate layer of lymph may be deposited upon any part of the inflamed serous surface.

Now, what will be the condition of the iris during an attack of inflammation of the membrane of the aqueous humor? At first its brilliancy will be merely slightly diminished, but as the disease progresses, its *polish* is totally destroyed, its surface is unequally dull, its motions are somewhat impeded, and I think I have observed that prior to any *appreciable* extension of inflammatory action to the *proper iritic substance*, its pupillary border has lost its perfect circularity, and its fine, definite and delicate edge, and that it is slightly puckered, uneven, and irregularly fringed and tufted; but I wish it to be distinctly understood that I limit these latter changes to those cases only in which the inflammation is not in the *course* of development, but most fully and completely established. I am now presuming that the *iritic portion* of the membrane of the aqueous humor has become involved in the inflammatory process, for although inflammation may commence in its *corneal*, its *irital*, or its *capsular* portions, and may be always distinguished when so limited, as being confined to the particular part in which it actually exists at that period, yet this limitation does not continue long—the whole surface of the membrane speedily becomes affected. When either the capsular or corneal portions of the membrane of the aqueous humor become much inflamed, there is, in addition to the general cloudiness of its surface, the more densely opaque spots which indicate the product of the inflamed state of the contiguous portion of either the crystalline capsule or the cornea, but, of course, when its irital surface is similarly inflamed, no such opaque spots will be witnessed, but, in their stead, there may sometimes be per-

ceived a change in the colour of the true iritic substance at that part.

You are aware that one of the most common effects of inflammation of a serous membrane, is, an increase of its natural secretion, and such indeed takes place in the disease under consideration, and the cornea acquires, in consequence, a peculiarly prominent appearance, and the patient is distressed with a feeling of tension of the globe, which together constitute perhaps the most strongly characteristic symptoms of the disease; but the nature of the part, the circumstances connected with the part in which this increase of secretion occurs, prevent that extensive accumulation (so long, at least, as the healthy properties of the cornea are unimpaired) which frequently takes place in many other parts of the body under a condition of inflammation. The outer membranes of the eye will not suddenly yield in their healthy state to any material extent, absorption becomes much increased by the pressure the effused fluids produce, and in this way, the accumulation of aqueous humor in the chambers of the eye is either altogether prevented, or prevented from taking place to any great extent.

I have already said that lymph may become effused, and it is to this circumstance, chiefly at least to this circumstance, that I have referred the dulness of the serous texture under a state of inflammation before it has become deposited in a quantity sufficiently ample to constitute a distinct layer or flaky mass; but independently of the effusion of coagulable lymph, in portions of various magnitude, into the aqueous humor, that humor becomes itself turbid, but not by dissolving the lymph so effused; it is, in fact, no longer a limpid transparent fluid, but is secreted as a dull turbid liquid, just in the same way, and for the same reasons, as any other inflamed serous mem-

brane modifies the qualities and particularly the transparency of its natural secretion. Again, it does appear to me that lymph may become deposited upon its surface in distinct masses sufficiently large to produce eventually adhesion of the iris to the anterior capsule of the lens, and in a very few instances to the neural surface of the cornea, but this latter occurrence takes place with comparative infrequency, unless the inflammation has extended to surrounding parts, owing to the distance at which the iris is situated from the cornea compared with the smallness of the space which intervenes between the anterior capsule and the iris. I am also pretty sure that pure inflammation of the membrane of the aqueous humor may fringe the pupillary border of the iris, and may form a delicate, reticulated, lymphatic adhesion between various parts of its pupillary edge; but it requires for the production of this effect either that the inflammation should be much prolonged or frequently repeated.*

* Mr. Lawrence states that inflammation of the membrane of the aqueous humor *generally* terminates in hypopium, but I apprehend Mr. Lawrence is here confounding an effect of inflammation of the proper substance of the iris with that of inflammation of the membrane of the aqueous humor. Although I do not deny that inflammation of the membrane of the aqueous humor may produce a puriform secretion from its inflamed surface, yet I am justified in saying that this occurrence takes place very rarely, from a knowledge of the usual products of inflammation of serous membranes in general. The occurrence to which Mr. Lawrence alludes can only be considered as the termination of inflammation of the membrane of the aqueous humor by admitting that the extension of inflammatory action to the proper iritic substance by which hypopium is produced, may be properly represented as the termination of that inflammation which originally led to the affection of the true iritic structure. In this way only and with this qualification, can I admit the accuracy of Mr. Lawrence's statement, and for the reasons I have previously explained, I do not think we can properly consider, purulent effusion a common or general consequence of inflammation of the membrane of the aqueous humor, according to the more strict and legitimate mode of referring effects to causes. Mr. Wardrop enumerates among the effects of simple inflammation of the membrane of the aqueous humor a change in the colour of the iris, such as can only be occasioned by an inflamed state of the true iritic

Inflammation of the membrane of the aqueous humor does not generally extend to other textures, and is not characterized by much intolerance of light; it is only when the inflammatory action extends, that there exists much intolerantia lucis.

I believe I have now explained all the symptoms connected with this description of inflammation; namely—1, a slight arrangement of pink vessels around, but not actually *close to*, the margin of the cornea;—2, a turbid or cloudy state of the aqueous humor;—3, a deep-seated dulness of the cornea, interspersed with spots, patches, or rings or lines of opaque matter;—4, a dulness of the other surfaces covered by the membrane of the aqueous humor;—5, a prominent state of the cornea;—6, and frequently a feeling of tension of the eye-ball, with an acute pain over the eye-brow and at the front and back part of the head;—7, scarcely any intolerance of light, and a very trivial increase of the lachrymal secretion; and I may just add, that the constitution is affected more or less with feverish excitement and gastric disturbance, but the constitutional symptoms with which inflammation of the membrane of the aqueous humor may be attended, are too variable to be reduced to any definite arrangement—they are sometimes severe but more generally so slight as scarcely to engage attention.

This disease generally occurs at the early and middle

structure; he says, when the effusion proceeding from the inflamed membrane of the aqueous humor is "combined with the natural colour of the iris, it produces a remarkable change in the appearance of the eye. If the iris be blue, the addition of the yellow albumen produces a green hue; and when the natural colour of the iris is brown, the admixture of lymph gives it a lighter tint,—changes which are remarkably striking when the diseased is compared with the sound eye." I am satisfied that such decided changes in the colour of the iris are never induced by an inflammation *confined to* the membrane of the aqueous humor.

periods of life; I have most frequently witnessed it in children, and have scarcely ever observed it in a very old person.

Modes of termination.—Inflammation of the membrane of the aqueous humor may terminate by producing an increase of its natural secretion; in the effusion of lymph which may be either within its texture, upon its surface, or blended with or floating among the aqueous humor; it may produce adhesion of the iris to the anterior capsule of the lens, or, as very rarely happens, to the neural surface of the cornea; or it may lead to inflammation of other parts. As respects the effusion of pus which Mr. Lawrence regards as one of the most frequent products of inflammation of this membrane, although I am unprepared to deny its occurrence in a few rare instances, I can only admit it as an exception, a very rare exception, to the more general modes of termination to which I had just adverted.* Purulent effusion is very seldom a product of inflammation of any serous membrane whatever. In those instances where from a combination of untoward events the iris is rendered adherent to the capsule of the lens, and the effused lymph becomes so completely organized that it is blended as it were with the structures it connects, I cannot discover that the substance so deposited as the result of inflammatory action, differs in any respect from the lymphatic deposition occurring as a consequence of the inflammation of a serous membrane in other situations.

Diagnosis.—There are two diseases with which this

* "Causæ hypopii proximæ sunt abscessus inter corneæ lamellas ortus, introque ruptus; exulceratio in corneæ superficie concava et iridis inflammatio in suppurationem transgressa." Clemens in *Scriptores Ophthalmologici Minores.* Vol. 1, page 143.

affection may be confounded, namely, inflammation of the cornea, and inflammation of the iris. With regard to the former of these affections I may mention, that the dulness is more superficial and more considerable, the pain less, the prominence of the cornea scarcely, or not at all, observed, and the feeling of distention of the globe is almost altogether wanting; the intolerance of light and lachrymation are greater, and the transparency of the aqueous humor is but very slightly, if at all, diminished. The arrangement of the blood-vessels also varies; for when the cornea is inflamed, the vascular zone passes quite to its margin, and vessels may be often noticed upon its surface or running between its laminæ. The symptoms of iritis differ in the following respects from those of inflammation of the membrane of the aqueous humor;—the arrangement of pink vessels around the cornea is more distinct, the dulness of the iris is much greater, its activity also is impaired in a greater degree, and the intolerance of light and lachrymation are much more considerable, whilst the feeling of distention of the globe and the prominent appearance of the cornea, are scarcely, or not at all, observed or complained of. Mr. Travers says, that "the aqueous humor is always rendered turbid by inflammation of the choroid and iris," but my own experience compels me to dissent from this opinion, and as a turbid condition of the aqueous humor is by no means frequently connected or necessarily associated, as I think, with inflammation of the choroid coat, I shall not extend my observations on the diagnosis of the disease under consideration, by explaining, in detail the mode of distinguishing it from an affection (choroiditis) to which it bears scarcely any resemblance.

Causes.—I believe that disorder of the alimentary canal, and an improper exposure of the organ to cold and damp

air or to a current of air, and prolonged use of the eye on objects requiring minute vision, are the most usual causes of simple inflammation of this membrane, but independently of these circumstances, I am unprepared to point out any particular cause of its inflammation different from those which excite ophthalmic inflammation generally. I have never known it arise from accident; nor have I observed it in any decided and definite form after the operation of extraction or keratonyxis;—no circumstance of this nature has given rise to inflammation which has been limited to the membrane of the aqueous humor in any case which has fallen under my observation.

Treatment.—Inflammation of the membrane of the aqueous humor is generally noticed in children, and is not characterized by those intensely severe symptoms which so frequently attend the acute inflammatory condition of the internal tunics of the eye. However, it is an inflammatory affection of a serous membrane, associated with circumstances which *may* produce great agony, and has a tendency to give rise to those morbid changes and to lead to that extension of diseased action which may seriously impair or totally destroy vision. In the first place, then, you would remove blood by leeches, applied in a quantity proportioned to the obstinacy and the severity of the symptoms and the constitutional power of the patient, and having administered one or two doses of opening medicine so as to evacuate the bowels very freely, you would have recourse to counter-irritation to the temple or above the eye-brow, which should be continued by means of a seton, an issue, or a blister, so long as the inflammatory symptoms remained. You would also prescribe calomel and antimony, calomel and rhubarb, or calomel and opium, according to circumstances. If the symptoms were somewhat acute, and the skin dry and husky, the

former of these remedies might be employed; the second formula would be preferred when circumstances rendered it desirable to maintain a slightly increased action upon the bowels; and you would make choice of the last of these combinations when lymphatic deposition or purulent effusion had occurred to any considerable extent, with a view, first, of arresting the inflammatory action upon which its presence and increase depended; secondly, with the intention of producing its absorption; and thirdly, with the hope of destroying the tendency to the perfect organization of any lymphatic matter which may be present. Regarding this disease as an inflammation of a serous texture having a strong disposition to produce various morbid products capable of impairing vision, the *general* propriety of the plan of treatment I have just recommended will be at once admitted; I am satisfied that in my own practice it has been pretty generally successful. I say general propriety of this treatment, for undoubtedly, it is not universally adaptive; for, if the symptoms be slight and lingering, and the subject of the disease be puny, weak, and delicate, a tonic or stimulating plan of treatment assisted by the employment of counter-irritation will be far preferable to the use of mercury.

The eyes may be bathed with a little goulard water if there is much external redness, and if they are very painful they may be fomented with a decoction of poppies, and if it should happen that the light is especially offensive, the eyes must be protected from its influence in the usual manner.

Mr. Wardrop has been at great pains to recommend the discharge of the contents of the inflamed membrane, and he has published a paper in the *Medico-Chirurgical Transactions*, for the express purpose of advising the

evacuation of the aqueous humor in certain morbid conditions of the eye, and has particularly mentioned inflammation of the membrane of the aqueous humor as being one of those affections to which this novel mode of treatment is peculiarly well adapted. However, I ought to state that he has not recommended this mode of treatment to the absolute exclusion of other measures which it may be judged necessary to adopt, but merely with the intention of relieving that painful feeling of distention of the globe, and of removing that frontal and occipital pain, which is so frequently a source of uneasiness, and also with the intention of placing the eye in the most favourable condition for the action of other remedial agents. You will then consider Mr. Wardrop as advocating this mode of treating inflammation of the membrane of the aqueous humor with these views, and as pre-supposing the existence of a preternatural prominence of the cornea, and a painful feeling of tension of the globe, and severe frontal and occipital pain, as essentially requisite to justify and render necessary this practice. You will bear in mind the general pathological views which regulate your conduct in the treatment of similar disease elsewhere, you will reflect on the condition of parts during the inflammation of serous membrane in other situations, and the mode of treatment employed for its reduction, and you will also take into consideration the inflammatory state of the part you are required to puncture, and the influence of other remedies upon the morbid accumulation of fluid in the chambers of the eye, before you decide upon the superiority of this practice. It will be remembered that this mode of treating *inflammation* is not employed in other situations —that the accumulated exhalations and secretions are not usually discharged by a surgical operation whilst the

inflammation which produced them, and which is still augmenting their quantity, remains.

There can be no doubt that this mode of treatment is only advisable (I am now speaking of inflammation of the membrane of the aqueous humor merely) when the accumulation of the aqueous humor is so considerable as to operate injuriously upon the structure of the cornea, and to give rise to those tormenting sensations which a suddenly distended state of the eye-ball is so capable of producing, but as these symptoms rarely take place to so great an extent, I am persuaded that this operation will be very seldom required, and I am confident from the experience obtained in the instances in which I have performed it, that the pain its performance occasions, and the injury it inflicts upon the inflamed membrane and also upon the cornea, are imperfectly repaid by the temporary relief it affords, for, it is at best but a palliative remedy, the good effects of which are of very brief duration, on account of the speed with which the aqueous humor is restored when artificially discharged and the little influence this operation exercises upon the *inflammation* which has occasioned the increased secretion. You cannot imagine that the cornea can be punctured under any circumstances without giving rise to a certain degree of irritation; nor can you suppose that an inflamed serous membrane can be incised without sustaining injury; neither can you expect that the manipulations necessary to secure and steady the eye, and its exposure to the light during the operation, can be otherwise than mischievous and productive of great pain. It would of course be wrong to consider the pain produced by puncturing the cornea of a healthy eye, a correct estimate of the uneasiness occasioned by fixing the eye and puncturing the

cornea, under a condition of acute inflammation. However, the circumstances previously mentioned may render such an operation necessary, and it is right therefore that I should point out, as far as I am able, the best mode of performing it.

Operation for the evacuation of the aqueous humor.—Having placed the patient upon a table in the recumbent position as for the operation of extraction, you would introduce a grooved needle through the temporal side of the cornea near to its junction with the sclerotica, and permit the aqueous fluid to dribble along its groove;* or, you may use a common extraction knife, and having made the punctuation at the temporal side of the cornea, press its flat surface against that portion of the divided cornea which is nearest to the sclerotica; or, you may employ a cataract needle slightly flattened and somewhat large towards its point, revolving it on its axis when you have completed the punctuation of the cornea at its temporal side, for otherwise the needle will accurately fill the opening in the cornea and prevent or only very partially permit the escape of the aqueous fluid. But whichever of these instruments you may employ, do not pass it so far into the anterior chamber as to incur the risk of injuring the iris, and take care to withdraw its point before the whole of the aqueous humor has been discharged, lest the iris become entangled and lacerated.†

* The extremity of this instrument should be lancet-shaped, and the groove along which the aqueous humor will flow, should terminate —not abruptly, but gradually—about a line and a half from its point.

† I ought to have stated the circumstances which first induced Mr. Wardrop to employ this method of curing or rather relieving the symptoms associated with certain inflammatory conditions of the eye attended with an increase of its fluid contents, because the fact is very curious and highly interesting. In examining an eye with the late Dr. Barclay, it was found that the cornea became dull and the anterior chamber clouded by pressing its contents forwards, and increasing

If the surface of the membrane of the aqueous humor be pretty extensively coated with a fine layer of lymph, it will not absorb as it ought to do—it will not freely absorb the aqueous humor, which at this period is secreted in larger quantity than usual; so that, under such circumstances, the administration of mercury is peculiarly requisite; for, by enabling the surface of the membrane to absorb the lymph which is attached to it, it restores to it, as it were, its capacity to absorb those fluid matters which will be then—when this adventitious coating is removed—in contact with it. This is a case in which the puncture of the cornea and the evacuation of the aqueous humor may be advantageously combined with the administration of mercury (if the cornea be very prominent, and the eyeball exceedingly tense and painful) until that valuable therapeutic agent has placed the serous surface in a condition to absorb without impediment the superabundant quantity of the aqueous humor.

SECTION II.—STRUMOUS INFLAMMATION OF THE MEMBRANE OF THE AQUEOUS HUMOR.

This disease is very apt to occur in scrofulous subjects, and is very frequently mistaken for and treated as strumous iritis, but it may be pretty readily distinguished from in-

the tension and plenitude of its front parts, and that this dulness and cloudiness was present or absent, just as the pressure upon the posterior and lateral parts of the globe was augmented or remitted. The fact was quite novel and extraordinary, and it occurred to Mr. Wardrop that some cases of opacity of the cornea might depend on an increased fulness of the globe, and that the treatment of such cases would be assisted by discharging the aqueous humor; subsequent reflection induced Mr. Wardrop to test its efficacy in one or two varieties of ophthalmia, and he eventually extended its application to

flammation of the true iritic texture, and it is right, of course, that such a distinction should be made. Its appearance is very similar to that of the preceding disease, (simple inflammation of the membrane of the aqueous humor) except that it rarely proceeds to so severe an extent; the opaque spots, which we compared to the eye of a pebble, and which we considered to arise from the extension of inflammatory action to the lamellar texture of the cornea, are less frequently noticed; and the effusion of lymph upon the iris, and into the aqueous humor, does not take place by any means so frequently, and seldom to so great an extent. It is indeed marked by a very trivial arrangement of pink vessels around the cornea; by a dulness of the aqueous humor; by a deep-seated cloudy, and nearly uniformly and equally cloudy state of the cornea; and by a haziness of the iris without any distinct and decided change in its colour, its mobility, or the state of the pupil, as regards its magnitude or the perfection of its outline; and what is very extraordinary, it is not (I speak only of the general rule) like the other forms of strumous inflammation of the eye, characterized by any considerable aversion to light, but, on the contrary, an eye so inflamed is scarcely more irritable to, or more intolerant of, the impression of light than when in a state of perfect health.

You will distinguish *scrofulous* from *common* inflammation of the membrane of the aqueous humor, by the following circumstances. It occurs in scrofulous children, and never after the age of twenty or twenty-five; the symptoms are less acute; there is less dulness and change

the relief of many forms of ophthalmic inflammation, and particularly to acute purulent ophthalmia—gonorrhœal ophthalmia—rheumatic ophthalmia—and inflammation of the membrane of the aqueous humor, to which latter affection it appeared to Mr. Wardrop to be peculiarly well adapted.

in the general appearance of the iris; rarely any of those somewhat dense opacities of the cornea which Mr. Wardrop has compared to the eye of a pebble; less effusion of lymph into the aqueous humor; less prominence of the cornea, and, consequently, less of that agonizing sense of tension of the globe, and that frontal and occipital pain which constitute so severe a part of the symptoms of common inflammation of the membrane of the aqueous humor; it is besides more tedious in its duration, and very rarely leads to the adhesion of the iris either to the cornea or to the anterior capsule. Perhaps there is no inflammatory disease of the eye so obstinate in duration as scrofulous inflammation of the membrane of the aqueous humor, and until this department of our profession was enriched by the investigations of Wardrop, Lawrence, Clemens, and others, it was neither known as a distinct affection, nor treated in a manner calculated to abridge its duration or prevent its return when once it had been dismissed.

This variety of inflammation of the membrane of the aqueous humor occurs much more frequently than its simple acute form, it is indeed a very common variety of scrofulous inflammation of the eye, and for want of a distinction between the *common* and the *scrofulous* inflammation of this membrane, the descriptions of some authors are, in many respects, contradictory and erroneous.

When stating the symptoms of this affection I mentioned that unlike the other varieties of scrofulous inflammation of the eye, it was not characterized by much intolerance of light, but I ought to have said this only in reference to the general rule, for many exceptions will be found to occur, so that we occasionally find that scrofulous inflammation of the membrane of the aqueous humor is attended with as much photophobia as some of the worst and most distinctly marked instances of strumous iritis.

Now, this disease is usually attended with certain constitutional symptoms requiring especial notice; it is frequently associated with a feeble and languid condition of the system, and a depraved state of the alimentary canal. It will very often be found upon inquiry that the appetite is defective and variable, and that the intestinal discharges materially deviate from the true characters of health.

The scrofulous children characterized by the delicacy of their organization, are peculiarly liable to tedious and repeated attacks of inflammation of the membrane of the aqueous humor.

Treatment.—The treatment of this disease will be modified by those circumstances which would regulate the treatment of any local scrofulous affection occurring in a similarly circumstanced condition of the system. Your knowledge of the various constitutional conditions of scrofulous patients in general must determine your selection of constitutional remedies. The liquor potassæ—the mineral acids—mercury—quinine—iodine—turpentine—purgatives—and various other remedies are useful in different instances, but their use will be determined by those circumstances, which would decide our choice of remedies under the existence of other local affections of an inflammatory character, occurring in a constitution similarly circumstanced in every respect.

Mercury which was so frequently employed when this disease was not distinguished from inflammation of the iritic substance, under a vague impression of the utility of mercury in cases of iritis, is now almost altogether abandoned in the treatment of scrofulous inflammation of the membrane of the aqueous humor, and in its stead, we have substituted the sulphate of quinine, which medicine would, on a first view of the subject, appear to be called for by the slightness of the local symptoms, the strumous

state of the constitution, and the debility of those in whom the disease usually occurs. I am not acquainted with any medicine capable of curing scrofulous inflammation of the membrane of the aqueous humor with so much promptitude and preventing its relapses with so much certainty, as the sulphate of quinine, and this latter circumstance is one of very great importance, for I can state from repeated observation of the fact, that although relapses of inflammation are so extemely frequent after one attack has been removed by bleeding and the administration of mercury to the production of its specific effect, they are comparatively seldom observed when the cure has been effected by the agency of quinine. However, I deem it right to limit its use very generally to those cases where the inflammatory symptoms are slight, where the local pain is trivial, and where the symptoms of debility are obvious, and the characters of scrofula emphatically marked; and to preface its employment by the administration of an efficient dose of some unirritating purgative medicine, and to institute some form of counter-irritation in the neighbourhood of the disease.

Cases such as these in which the symptoms just enumerated are present *demand* the use of quinine; but there are other instances in which its administration may not be so distinctly and unequivocally indicated, and we can only decide upon the propriety of adopting such a course of treatment by the failure of other means, and by the extreme and unusual obstinacy of the inflammatory affection of the eye.

There are instances in which the application of leeches may be advisable, and I am by no means desirous of wishing to overlook so important a means of subduing local inflammation; but certainly they are not very often required in these cases. Local inflammatory action may

be greater and more obstinate than usual, and may give rise to pain and irritation approaching in severity to that occasioned by common inflammation of this membrane—inflammation unmodified by struma—although the countenance may be pale, and the system attenuated and enfeebled, and in such cases we may with perfect propriety apply two or three leeches to the eye-lids occasionally, and administer tonic remedies at the same time.

Diaphoretics, the use of the warm bath, and hand rubbing, may be serviceable when the skin is dry and harsh, and has acquired that husky condition which indicates impaired cutaneous warmth and circulation, and diminished perspiration.

Now, in a disease characterized by debility, and frequently and generally associated with derangement of the alimentary canal, you would deem it necessary to regulate the exercise of the patient, to give strict directions respecting his diet, and to advise his friends to prevent chilliness of the surface of the body by the employment of warm clothing. The kind and amount of the exercise would be regulated by the strength of the patient, and by the state of his feelings after walking, or rather after riding either on horseback, or in some open vehicle, which is always preferable where debility prohibits much muscular effort. But I have already discussed these matters in the course of my remarks on strumous conjunctivitis, and have also stated my opinions respecting the clothing, diet, and exercise proper for scrofulous children.

I have tried the iodine in the form of tincture and solution in some of these cases, but although I have selected favourable specimens of the disease for the purpose, and have aided its efficacy by the adoption of the preparatory process with which I advised you to

preface the administration of the sulphate of quinine, I have not found it particularly useful, and when compared with the advantages resulting from the use of the quinine, it must be considered a remedy of very secondary and subordinate utility. You may give a child of six or seven years old half a grain of quinine in the form of a pill, three or four times daily, or administer a table spoonful of the following mixture three times a day:—

℞. Quininæ sulph: gr. X
Syrup: cort: aurantii ʒ ss.
Infus: rosæ ʒ vss. Misce. Fiat Mistura.

I sometimes prescribe, in conjunction with this mixture, a powder to be taken every morning, consisting of five grains of hydrargyrus cum creta and three or four grains of rhubarb, and I think it has proved an useful auxiliary to that admirable tonic.

It may appear somewhat singular that the diluted sulphuric acid with the infusion of roses is an excellent medicine in some of these instances, whilst in other cases, the local disease being precisely similar, the administration of the carbonate of soda or the liquor potassæ is attended with the most salutary results. Now in the former of these instances, it would appear that the system merely required the invigorating influence of some tonic remedy, whilst in the latter, it would seem as though the saline particles of the blood existed only in a diminished quantity; but as I cannot be expected to enter into the merits of this latter question, I must refer those who have a desire to investigate the matter fully, to the work of Dr. Stevens,* and also to the papers he has more recently

* *Observations on the Healthy and Diseased Properties of the Blood.* By William Stevens, M. D.

published in the *Medical Gazette*;* to the work of Dr. O'Shaughnessy,† and to that of Mr. Prater.‡

I have only to say respecting local applications that they are of very little service; you may use some anodyne fomentation or an aqueous solution of opium if there is much pain in the eye. And should symptoms be very severe you may judge it necessary to evacuate the aqueous humor, and the observations on this means of affording relief which were made in reference to simple inflammation of the membrane of the aqueous humor are equally applicable to this variety of the disease.

To epitomize what may be termed the general treatment of strumous inflammation of the membrane of the aqueous humor:—1, leeches to be occasionally applied to the lower lid;—2, a seton or issue to be made in the temple or at the back of the neck;—3, two or three grains of the sulphate of quina to be administered in divided doses during the day;—4, hydrargyrus cum creta with rhubarb to be given every morning or every other morning;—5, the occasional use of diaphoretic medicines, or the warm bath, or hand rubbing;—6, warm clothing, and especially the wearing of flannel next the skin;—7, pure wholesome air;—8, light nutricious food; and lastly, a due but not a fatiguing degree of exercise. As regards other medicines, such as the liquor potassæ, mercury, turpentine, iodine, purgatives, the mineral acids, and so on, you must be guided in their selection and administration by the circumstances previously mentioned.

* *London Medical Gazette.* Vol. 10, page 836.

† *Report on the Chemical Pathology of the malignant Cholera containing Analyses of the Blood, &c.* By W. B. O'Shaughnessy, M. D. 1832.

‡ *Experimental Inquiries in Chemical Physiology.* Part 1, complete in one volume, on the Blood. By Horatio Prater. 1832.

SECTION III.—VARIOUS PATHOLOGICAL CONDITIONS OF THE MEMBRANE OF THE AQUEOUS HUMOR.

When a piece of metal or other foreign body falls into the anterior chamber and remains in contact with the serous membrane, it may eventually become encisted—the membrane of the aqueous humor may inflame and cover the foreign body with a secretion, which may ultimately become changed into a delicate tunic enveloping the intruded substance. A foreign body so covered may remain for some time and produce no inconvenience, but if from any cause its tunic ulcerate or become absorbed so that the part it protected is again exposed, then irritation may be excited in so severe a degree that it may be necessary to remove the irritating agent by a surgical operation. The following case occurred under my own observation some time ago.—A man received a blow upon the eye whilst employed in turning metal, and he came to me a few days after the accident. At this period there was present a smart attack of iritis, a slight degree of hypopium, and a mark at the centre of the cornea indicating the spot at which the metal had struck the eye. A small portion of metal was seen at the bottom of the anterior chamber in contact with the iris. By the aid of bleeding, and the use of mercury, the immediate effects of the injury were controlled, and in the course of a few weeks the foreign body was covered with a semi-transparent matter, which eventually became sufficiently clear to permit the foreign body to be plainly seen through its texture. Two years afterwards this person called upon me to say that he had again received a blow upon the eye that was formerly injured, and I then ascertained that the

cist containing the foreign body was ruptured, and, in fact, that the particle of metal was floating loosely about in the anterior chamber. I was eventually obliged to remove this particle, by making an incision in the cornea, for it produced severe inflammation which threatened suppuration of the eye-ball, and no attempt at the formation of a new cist was observed.

Sometimes the membrane of the aqueous humor would appear to be the seat of ulceration—primary ulceration. It is occasionally thickened and rendered opaque, and I have seen it changed into bone, and I have also noticed ossific deposition upon its surface.

CHAPTER VI.

EFFUSIONS INTO THE CHAMBERS OF THE EYE.

Hypopium.—The collection of a quantity of purulent matter at the lower part of the chambers of the eye is termed *hypopium*. The hypopium is stated to be *true* when it arises independently of breach of surface, but when it results from the bursting of an abscess of the iris or of the cornea, or from an ulcer on the neural aspect of the cornea, it is said to be *false*.

The matter of hypopium varies somewhat in its characters in different cases and at different periods of its existence.* It usually possesses the ordinary characters of common pus, is sufficiently fluid to change its position during any active movement of the body, and becomes more consistent after it has been deposited for a long period. When hypopium is produced by inflammation, the matter first deposited is least consistent, so that it eventually rests upon the surface of the denser part of the secretion; and, in such instances, the characters of fluidity, as evinced by the change of situation during any active movement, are confined to the surface of the secreted matter. Blood may be mixed with the pus, and will occasion a certain change in its colour which renders the malady a mixed affection—an affection compounded of hypoæma and hypopium.

The upper surface or margin of the hypopium is for the

* "Pus ab initio albidum, flavescentem deinde colorem exhibet." Clemens in *Scriptores Ophthalmologici Minores*. Vol. 1, page 143.

most part level, or slightly convex, its lower margin being adapted to the concavity presented by the floor of the anterior chamber. It is not however always contained in the anterior chamber, for when it exists in large quantities it may rise on a level with the lower part of the pupillary margin of the iris, and pass through the pupil behind the iris, when it will be distinguished by projecting the iris towards the cornea. When the matter of hypopium is placed between the iris and the anterior capsule, it is generally produced by the bursting of an abscess on the capsular surface of the iris, by the inflammation being confined to, or most acute in, the serous surface at the back of the iris, or by the increased secretion of pus after it has risen on a level with the pupillary border of the iris.

Progress of hypopium.—Hypopium first appears as a small whitish-yellow mark at the lowest part of the cornea, which, if the disease from which it results continue, is very likely to increase until it completely fills the anterior chamber, projects the cornea, and effects those changes in its texture by which its transparency &c. is permanently destroyed.

Causes.—Hypopium or effusion of matter into the chambers of the eye may take place after severe operations; from phlebitis resulting from parturition and other causes; and from defective nutrition of the eye-ball. It is however usually caused by the bursting of an abscess of the cornea into the anterior chamber, from the existence of an ulcer on the neural surface of the cornea, from the opening of an abscess of the iris, and from acute inflammation of the membrane of the aqueous humor.*

*"The matter of hypopium is not the product of an abscess or ulceration of the internal or external membranes of the eye-ball, but simply the result of a transudation of coagulable lymph from the internal surface of the inflamed choroidea and uvea." Briggs' translation of Scarpa's *Practical Observations*, &c. page 293.

If hypopium exist in an extreme degree it is apt to impair the vitality of the cornea, to induce onyx, and to lead to staphyloma. The disease determining the purulent effusion into the chambers of the eye, frequently leads to serious injury to surrounding textures.

*Treatment.**—The treatment of hypopium is frequently nothing more than the treatment producing it. If, for example, the effusion of pus depend on the bursting of an abscess of the iris, from inflammation of the membrane of the aqueous humor &c., the measures adapted to their cure will usually be adequate to insure the absorption of the secreted matter. When the matter of hypopium is very considerable in quantity, it has been proposed to remove it by making an opening in the cornea, and allowing it to pass through the aperture,† on the supposition

* The following curious passage, in reference to the treatment of hypopium, occurs in the work of CHANDLER. "There is another method of cure said to be made use of formerly by JUSTUS, a celebrated oculist in the time of GALEN. His method was, to place the patient in a seat opposite to him: he then took hold of his head with both hands, which he strongly shook and agitated, until the adventitious fluid entirely disappeared." (*A Treatise on the Diseases of the Eye*, page 157.) HEISTER has treated at some length of the "Curatio hypopii per capitis agitationem," in his *Institutiones Chirurgicæ*. It would appear from the preceding authorities that it is not always so improper to "shake a patient" as MR. COLEMAN's poetical apothecary would represent.

† The treatment of hypopium by endeavouring to procure the discharge of the matter by making an incision of the cornea, is recommended by TURNER, RICHTER, LANGENBECK, WALTHER and MONTEATH, but strongly, and I think very properly, objected to by many modern writers, and among others, by MACKENZIE and LAWRENCE. MR. LAWRENCE says, "I lay it down as an invariable rule not to puncture the cornea in hypopyon. I never saw an instance of hypopyon in children where the puncture of the cornea was necessary or even justifiable. These cases invariably do well under other treatment." *A Treatise on the Diseases of the Eye*, page 279.—CHANDLER (*A Treatise on the Diseases of the Eye*, &c. page 156) advises the cornea to be opened in severe cases of hypopium "in order to prevent the destruction of the eye;" and he proceeds to state that "if the noxious humor does not then flow out sufficiently of itself, the eye is to be gently compressed and stroaked with the fingers, or some warm water may be injected through

that it had some irritating or acrimonious quality by which it injured the parts with which it was in contact, or burst them by its pressure. It will be remembered that the matter of hypopium is often a product of inflammation which is for the most part manageable by the use of medical means, and that the effusion will continue until the inflammation which produced it is removed, so that

the opening with a small syringe, which will wash and carry out the offending matter along with it." This method of stroking the eye, after having divided the cornea, with a view of eliciting the transit of the matter of hypopium, would appear to be the customary method of operating practised by HEISTER, (*Institutiones Chirurgicæ*, page 630) who gives pretty much the same advice as CHANDLER, in the following words:—"Si non satis per se humor noxius effluit, digitis leniter comprimi atque demulceri oculus debet." WARE (*Observations on the Ophthalmy*, &c. page 80.) has very minutely explained the mode of opening the cornea for the purpose of discharging the contained matter, and he proceeds to remark that "in some cases, matter, after having been discharged by the operation, has again collected in the same part; and, in a few instances, this has been repeated several times; the best expedient for preventing which, is to take care that the first incision of the cornea is sufficiently large. But should matter form after the first opening, to whatever cause it be owing, it will be absolutely necessary to repeat the operation; and this as often as there shall be found occasion."—WENZEL (*Dictionaire Ophthalmologique*. Tom. 1, p. 371) has repeated the advice of WARE in reference to the magnitude of the corneal section. He goes on to remark "le plus souvent, une seule incision suffit pour évacuer sans retour la matière puriforme; néanmoins, dans quelques espèces d'hypopyons, on est obligé, pour achever la guérison, d'y avoir recours deux ou trois fois, à des intervalles plus ou moins courts"—A free incision of the cornea is also advocated by EDMONSTON. (*A Treatise on the varieties and consequences of ophthalmia*, page 317.) On the contrary, BENEDICT (*De morbis oculi humani inflammatoriis*. § 231,) advises that only a small incision of the cornea be made; he says, "Præterea corneæ incisio cauta manu et ita peragatur, ut parva sit, nec talis uti in cataractæ extractione."—I shall conclude my reference to the section of the cornea as a means of relieving hypopium, with the following extract from the work (*A Compleat Body of Chirurgical Operations*, page 338) of VAUGUION; "Let the Artist place the Patient in a Situation fit for the Operation, let him depress the Eye with a *Speculum Oculi*, and make an Incision with a Lancet on the Tumour at the bottom of the *Cornea*, and compress the Eye to squeeze out the *Pus*. Some would have the Surgeon Suck it out through a Pipe, when it is too thick to come out by any other means."—He then proceeds to describe the *pipe* which the surgeon is privileged to use.

the real question appears to be, is the section of the cornea a proper remedy for the subduction of inflammation of the iris and membrane of the aqueous humor? I apprehend that in such instances, the section of the cornea can confer no benefit. Again, the deposited matter is sometimes so consistent that it cannot be discharged by—it will not pass through—an opening in the cornea; and further, the cornea is very likely to become staphylomatous after the operation, more especially if made as ample as WARE, WENZEL, EDMONSTON, and others have advised.

The proper method of treatment appears to be that of relying upon the measures which are suited to the cure of the inflammatory malady which caused the purulent accumulation, and only to make an opening in the cornea when the pus or purulent matter is collected in large quantity, is producing great pain, and has already proceeded so far that there is no reasonable chance of effecting the restoration of vision by the further continuance of constitutional treatment. I am not aware that there is any particular treatment adapted to the removal of hypopium different from that which is required for the cure of the disease (whatever may be its nature) from which it proceeds.*

* WARDROP mentions a case from SCHIEGEL where "by the application of an emollient decoction, the matter discharged itself in an uncommon manner. Whilst using it, the fine pores of the cornea opened, and the matter oozed out in the form of delicate threads. On the second day the distended cornea was considerably flatter, the oozing out of the matter continued without interruption, and in four days nearly two drams of matter had passed through the pores."—The following case is quoted by Mr. WARDROP from JANIN:—"PETER VALIS consulted me about a periodical blindness with which he had been affected for twelve months, during the first fifteen days of every month; and after that time had elapsed, his eyes were restored to their natural state. I examined the organ in order to ascertain the cause of that singular kind of blindness, and I observed that the anterior chamber of both eyes was filled with a yellow-coloured matter, so thick as neither to allow the colour of the iris, nor the state of the pupil, to be seen through it. The most remarkable circumstance in this case was,

Hypoæma.—Effusion of blood into the chambers of the eye sometimes results from local injury,* from laceration of the iris in the operation for extraction and the formation of artificial pupil, or from the bursting of an abscess of the iris, or from fungous growths from that membrane (Wardrop, Lawrence,) and occasionally it would appear to be secreted by, or effused from, the vessels of the membrane of the aqueous humor,† connected or unassociated with

that the conjunctiva was very little inflamed, and the eye not painful." *The Morbid Anatomy of the Human Eye*, Vol. 1, page 50.—"Datur et *hypopium periodicum* certis temporibus ægro rediens, *metastaticum*, ubi pus ab alia parte humani corporis avulsum in cameram anteriorem se deponere amat." Clemens in *Scrip. Ophthalmologici Minores*, Vol. 1, p. 143. I have witnessed nothing like what Janin and Clemens term *periodical hypopium*.

*"In consequence of a blow with the fist, a drop of blood was effused in the anterior chamber at the junction of the cornea and iris, but in a few days it was altogether absorbed." Wardrop. *Morbid Anatomy, &c.*, Vol. 1, p. 139.—"En examinant à diverses reprises l'œil gauche de son altesse le Landgrave de * * *, M. Jeanroy, et moi, nous avons observé que les membranes de l'œil etaient enflammées. La chambre antérieure était remplie d'un sang noir, et Son Altesse, qui ressentait une douleur sourde le long de l'arcade sourcilière, au front, et à la temp du côté de l'œil malade, n'entrevoyait pas même la flamme d'une bougie qu'on présentait à cet œil en tenant le droit fermé." Demours. *Traité des Maladies des Yeux*, Tom. 11, p. 249.—"Velocissimam resorptionem in rustico quodam juvene observavi, cui, a militibus plagis percusso et in regione supraorbitali sinistri oculi vulnere afflicto in nosocomio chirurgico Ill. Langenbeckii operam impendi. Iridis magna pars ab orbiculo ciliari separata erat et regio oculi anterior sanguine plenissima jam tertio die ne vestigium effusi humoris, quin limpidissimum humorem aqueum exhibebat." Clemens in *Scriptores Oph. Minores*, Vol. 1, p. 145.

†"When the internal parts of the eye are much inflamed, the aqueous humor often loses its natural transparency, and becomes tinged of a red colour from the admixture of blood. The red shade turns deeper as the quantity of effused blood increases, and in very violent inflammation, the blood is sometimes effused in such a quantity as to render the aqueous humor so opaque, that the iris and pupil cannot be distinguished." Wardrop. *Morbid Anatomy, &c.* Vol. 1, p. 138.—"In some rare instances blood has been poured into the anterior chamber without previous injury or inflammation, or any recognizable morbid state of the organ." Lawrence. *A Treatise, &c.* p. 381.—"To such cases as these, I do not mean at present to direct the attention of the reader; but to an internal hæmorrhage of the eye, which appears neither to arise from injury nor to depend altogether on inflammation, and which sometimes has been spoken of under the name of *apoplexy of the eye*." Mackenzie. *A practical Treatise, &c.* p. 536.

inflammation. A case is related in the fifth volume of the *Medical Gazette*, in which an effusion of blood "occupying the lower part of the anterior chamber, changing its place with the movements of the head, and rising to a level with the edge of the pupil," occurred during the night in the eye of a female, forty-five years old, who had "ceased to menstruate during three months without inconvenience." Mr. John Bell relates an instance of the sudden effusion of blood into the anterior chamber from the exertion of running, which effusion subsequently occurred on many occasions without any evident cause. The case is quoted at length by Mr. Mackenzie.

The effusion of a milky fluid into the anterior chamber has been observed by Rosas.

*Treatment.**—It frequently happens that when blood is effused into the chambers of the eye from local injury, the violence of the injury which is necessary to produce that effect, excites considerable ophthalmia, or gives rise to a condition of things which is likely to terminate in suppuration of the eye-ball. So that the propriety of antiphlogistic measures is sufficiently apparent. If the effused blood exists in large quantity, if it gives rise to a manifest prominence of the cornea, or excites great pain, if suppuration of the eye-ball has occurred, if loss of the function of the organ appears to be inevitable, it may be justifiable and necessary to open the cornea, but in all cases it is desirable to avoid this operation if possible, on account of its tendency to lead to staphyloma. When *hypoæma* results from slight contusion of the eye-ball, and is not present in an extreme degree, I very generally

* One of the chapters in Heister's large work on Surgery is entitled "Quomodo cruor in oculum effusus, per incisam corneam emitti possit." He relates an instance in which the practice he recommends was adopted with success.

recommend bleeding, and the application of a blister near to the injured part, and if the circumstances of the case do not lead me to apprehend sloughing of the cornea, I usually administer a small quantity of calomel and opium so as to maintain a slight degree of ptyalism. The application of cooling lotions to the eye is only necessary where there is much swelling and ecchymosis of the lids, much increased heat of the affected organ, and a great degree of external ophthalmia. The use of warm herb fomentations is however preferable, and is adapted to the condition of the eye, whether sloughing of the cornea be apprehended or not.*

* The following case is one of many which have fallen under my care in the course of my practice, and appears to me to consist of a deposition of solid matter within the anterior chamber, and to be only attached to that point where the margin of the iris and cornea are connected.

Case.—Mrs. Lowe, æt. 26, has the following appearance in the right eye. Some of the vessels towards the inner canthus are a good deal enlarged, there is a slight vascular arrangement near the corneo-sclerotic junction at its inner side, and a red deposition upon the iris, which makes an oblique section of that part of its ciliary margin placed near the nose; the deposition is of a mahogany colour, appears to push or fold the iris before it, and to occupy, as far as it extends, the whole space between the neural surface of the cornea and the corneal aspect of the iris. The pupil is not circular (though it is influenced by varying degrees of light) for that portion of its edge opposite to the deposition appears to be paralyzed. The eye is not painful, there is no increased lachrymation present, nor any aversion to light.

The disease appeared (I have often noticed a similar state of disease in women who had been recently confined) soon after a miscarriage attended with severe flooding.

Treatment.—The disease was removed in about six weeks by the agency of alterative doses of mercury and small doses of quinine; a blister was also applied behind the ear once a week, during the continuance of treatment.

I have seen one or two instances in which this deposition existed in a sufficiently large quantity to conceal the pupil, but though it had acquired a very visible and intense degree of vascularity, I could not perceive that it contracted any adhesions or formed any visible association by means of blood-vessels with either of the tissues between which it was situated. When it has existed for a considerable period, it acquires so secure a measure of vitality that it is as little influenced by mercury, or indeed by any medicines, as the original tissues of the body which are placed around it. The disease is very apt to affect both eyes—not simultaneously, but consecutively.

CHAPTER VII.

DISEASES OF THE IRIS.

PRELIMINARY OBSERVATIONS.—There are entering into the composition of the iris, blood-vessels, and nerves, and absorbents; there is also a peculiar structure by means of which its motions are effected, and respecting the precise nature and qualities of which, there has been much scientific controversy; but I shall not on the present occasion enter into this question with a view of pointing out the anatomical peculiarities in the structure of the part, so as to deduce from thence an explanation of the nature of that action or process by means of which the motions of the iris are effected. In a therapeutical point of view merely, independently of other considerations, it is necessary, however, that I should specially direct attention to that particular structure of the iris by the direct agency of which the pupil is either contracted or dilated, which is enveloped by a serous membrane, and which, to prevent confusion, I have preferred to name the "proper structure of the iris," or the "true iritic structure."* Whether, therefore, the iris acts by virtue of an elastic, erectile, or contractile property,

* They who are desirous of investigating the minute anatomy and the physiology of the iris, may consult the writings of VESALIUS, RUYSCH, WINSLOW, MERY, HALLER, MORGAGNI, WRISBERG, PETIT, BRIGGS, MONRO, PORTERFIELD, ZINN, SOEMMERING, YOUNG, BICHAT, BELLINGERI, BELL, MAYO, JOURDAN, &c.—MR. WALKER, of Manchester, and MR. THURNHAM, of London, have recently published some ingenious views respecting the physiology of the iris.—(*Medical Gazette*, vol. 13.)

or whether it possesses muscularity, or that cavernous tubular structure, which, according to M. Mery, is capable of being swollen and expanded by the agency of light upon the retina, constitutes no necessary part of my present inquiry.

In addition to nerves, blood-vessels and absorbents, and the proper iritic substance to which I have just referred, there are entering into the composition of the iris, cellular membrane connecting its serous covering to the subjacent parts, and also connecting together the various portions of the iritic substance; and lastly serous membrane—the irital portion of the membrane of the aqueous humor—which forms its external covering.

There are two important arterious circles in the iris, which produce certain appearances when that membrane is inflamed; one of these circles is formed at the pupillary, and the other at the ciliary margin of the iris; they each consist of a great number of minute vessels which intimately and freely anastomose with each other.*

The posterior surface of the iris is coated with a dark pigment analagous to that which covers the external surface of the choroides. The intensity of its colour, and also its quantity are liable to variation, and when such variation takes place in any great degree, it is indicated by particular symptoms which will be presently described.

With these few remarks as affording an explanation of the various symptoms and the various products of inflammation of the iris, in accordance with the particular texture

* The two arterious circles of the iris, so important to be remembered when considering the pathology of iritis, are but imperfectly exhibited by Hovius, (*Tractatus de circulari humorum motu in oculis.* Tab. 2.) well represented by Dalrymple, (*The Anatomy of the Human Eye.* Table 2.) and admirably delineated in the unrivalled work of Zinn, (*Descriptio Anatomica oculi humani iconibus illustrata.* Tab. 3.)

to which the inflammatory action may be limited, or in which the inflammation may commence or be most severe, I shall conclude my observations on the anatomical qualities of the iris.

In speaking of inflammation of that portion of the membrane of the aqueous humor which constitutes the serous covering of the iris, I had occasion to allude to the frequency with which the effusion of coagulable lymph took place, and the infrequency with which hypopium or true purulent effusion occurred, which pathological facts are in perfect accordance with our knowledge of the usual products of acute inflammation of serous membranes in other situations; and, in the course of my present observations, I shall refer to abscess of the iris from an inflammatory affection of its cellular texture, and to other morbid products which the inflamed condition of its proper iritic substance is presumed to occasion. However, you will not understand me to imply, in the use of the term iritis, that the inflammation is in every instance actually limited to the iritic substance, throughout all the stages of the disease, but merely that that substance is for the most part primitively and most severely affected, and that when other parts of that structure become involved, such implication in morbid action is owing to the contiguity of the serous covering to the proper structure of the iris; the cellular tissue which, as I have explained, enters into the composition of this part, from the intimacy of its connexion with, forming as it were a part of, the true substance of the iris.

There are indeed unequivocal evidences of the limitation of morbid action to this one texture of the iris at the period of its commencement, evidences much more unquestionable and distinct than any the pathologist can obtain respecting the nature of the disease during the life of an individual suffering from inflammation of either the

serous, the muscular, or the mucous tunic of the intestines, or of any other part into the composition of which these tissues enter in similar or nearly similar proportions. The increased vascularity which sometimes takes place in the neighbourhood of a part acutely inflamed, is not, when merely confined to such a slight participation in the more important and distinctly marked mischief, entitled to the appellation of decided inflammation.

Now, although, as we shall presently explain, inflammation of the iris is marked by symptoms of the most distinct description, yet, until the year 1801, when Professor SCHMIDT published some remarks on *Secondary Cataract and Iritis after the operation for Cataract*, this disease was unknown, at least by name, in this country. Since that period, however, the subject has been much attended to, and I may assert without fear of contradiction, that few diseases of the eye are now better understood, more correctly treated, or more manageable by the judicious application of remedies. Perhaps, however, the greatest improvement in the treatment of acute idiopathic iritis, was made by DR. FARRE, who was the first, at least in this country, to suggest, in a distinct and decided manner, the employment of calomel and opium, given to the production of ptyalism, in simple acute iritis—iritis unassociated with any modification resulting from an specific constitutional disease.

I shall now proceed to describe the symptoms of the various forms of iritis, and shall first speak of simple acute iritis, then of chronic inflammation of the iris, and shall afterwards describe those varieties of iritis which are modified in their characters by some constitutional affection, such as syphilis, gout, rheumatism, scrofula, &c.

SECTION I.—SIMPLE ACUTE INFLAMMATION OF THE IRIS.

There are certain *general* symptoms of inflammation of the iris, which equally belong to all its varieties, and which, therefore, I shall concentrate in one group; and 1, there is a zonular arrangement of pink vessels around the cornea;—2, dimness of vision;—3, intolerance of light;—4, increased lachrymation;—5, diminished brilliancy and mobility of the iris, with sometimes change in its colour;—6, contraction and frequently irregularity, displacement and muddiness of the pupil.

Symptoms of simple acute iritis.—The early symptoms of simple acute iritis are, a slight zonular arrangement of pink vessels around the cornea, some intolerance of light and increased lachrymation, diminution in the brilliancy and mobility of the iris, a contracted state of the pupil, and some degree of pain in the eye-ball, and in and around the orbit. The symptoms of the second stage are more decided and severe; the arrangement of pink vessels around the cornea is more distinct; the intolerance of light greater; the lachrymation more considerable; the iris is extremely dull,—its capability of motion being almost destroyed; the pupil much more contracted and slightly irregular; the pupillary border of the iris thickened, and the pain in the eye-ball, and in and around the orbit, much more tormenting; there is also much more external redness, more of what is termed ophthalmia externa. The third stage when permitted to arrive, comprises the aggravated state of all these symptoms, with sometimes the extension of inflammatory action to other parts, or the *incipient* appearance of some of the *effects* of iritis to be afterwards described.

Redness.—According to the stage and the acuteness of

the disease, there will be a greater or lesser degree of enlargement of some of the sclerotic and conjunctival vessels, and the pink vascular zone around the cornea will either form partially or generally, just as the whole or a part only of the iris may be affected, or it will be distinct and perfect, or slight and incomplete, as the disease may be acute or otherwise. The vascularity of the conjunctiva may be very considerable, and may even withdraw attention from the more important deep-seated mischief, unless fully aware of this occasional complication produced by the combination of morbid action. The sclerotic vessels, will sometimes enlarge, but rarely to any great magnitude, unless at the latter stages of acute iritis, the course of which has been unmitigated by treatment. With regard to the zonular arrangement around the cornea, I may mention that the vessels composing it are of a pink colour, and do not absolutely pass to the margin of the cornea but dip deeply into the sclerotica a little before they reach it; they are very minute, very numerous, and anastomose very freely, forming a beautiful vascular wreath. In consequence of their passing so deeply to the iris, a little anterior to the margin of the cornea, a white line is left around this tunic, which is most distinctly marked in those cases where the inflammatory action is extremely acute, and this vascular zone very perfectly formed, and where the disease has not extended to the cornea; but this abrupt termination of the redness, as respects its corneal border, does not occur on the other side of the vascular wreath to the same extent; on the contrary, the redness is gradually shaded, and merged as it were into the general vascularity of the external tunics, and the enlarged sclerotic vessels situated towards the periphery of the globe.

On a former occasion I mentioned that there existed a

free communication just around the cornea, between the external and internal vessels of the eye, particularly between those supplying the conjunctiva, the sclerotica, the iris, and the choroides, and you must attribute the formation of the vascular wreath which takes place in this situation, not merely to the enlargemement of those vessels which proceed to the iris and constitute its proper nutrient tubes, such, for instance, as the long and the anterior ciliary arteries, but also to the simultaneous enlargement of the communicating vessels—the vessels which more immediately connect the external and the internal circulation of the eye.

Loss of the brilliancy of the iris and change in its colour.—The iris does not undergo any absolute *change in its colour* at the commencement of iritis, but its brilliancy—its polish—is at once diminished, and as the disease progresses, the smooth, polished and brilliant surface, is exchanged for a dull, puckered, and uneven one. Its colour too becomes changed during the progress of the disease, not from the enlargement of its blood-vessels, nor, as far as I can discover, from any change wrought in the colour of their contents either by the existence of inflammatory action, by the retardation of the circulation, or by any deteriorated quality of the blood in consequence of the comparatively slow condition of the circulation in its capillary tubes, but from the effusion of inflammatory products either within its texture or upon its surface.

When the entire texture of the iris is inflamed, that is, its serous, cellular, and proper iritic texture, there may be—first, an effusion of coagulable lymph upon its surface, as an effect of the inflammatory state of its serous covering; and, this effusion of lymph may be either visible as a distinct patch or layer upon its surface; or it may be intertextural, so as to give to that membrane a generally

dull and nebulous appearance; or it may be effused among the aqueous humor, rendering that fluid, in addition to the dull state in which it is secreted during the existence of inflammation of any part of the membrane which secretes it, extremely turbid by the agitation it experiences in the movements of the eye and of the body, and the partial solution it undergoes; and there may be also occasionally observed some small portions either as minute masses or shreds, floating in the anterior chamber. Secondly, there may occur effusion of pus or the formation of an abscess, in consequence of the inflammation more particularly affecting the cellular membrane connecting the serous covering of the iris to its proper iritic substance, and also that connecting together the various fibres of the latter structure. In such cases an abscess may sometimes be observed to project from the anterior surface of the iris, which, after awhile, if its contents be not absorbed, will burst and empty itself into the anterior chamber. However, this appearance (the appearance of abscess) is more commonly observed in that form of iritis termed syphilitic, and the projections so produced were supposed by BEER to be similar to those condylomatous excrescences which appear on the organs of generation in some venereal cases. In such instances the sides of the cist may be seen floating in the aqueous humor for some time after the abscess has burst, and it will be observed that the fluid or solid matters are gradually absorbed, and that the cavity which contains them contracts, and becomes obliterated under the influence of judicious treatment. But the more important fact to which I am anxious to direct attention, is, the effusion of lymph into the proper iritic texture. In supposing that the true iritic substance, is, in the instance in question, primarily inflamed, and that other parts merely become affected by

the extension of diseased action from the circumstance of contiguity, I am guided not merely by analogy, and a knowledge of the anatomical characters and relations of these parts, but also by that difference in the symptoms which attend such cases, and those which are present when the serous covering of the iris alone is inflamed. The iritic substance is then mixed, in some instances, with coagulating lymph, its texture becomes thickened, and dull, and irregular instead of being smooth; for, the consequence of the addition of lymph must be to increase its substance, and therefore to increase its thickness, and by producing an irregular adhesion of the iritic fibres to each other, to destroy its smoothness and equality, and to lead to that puckered appearance which may be so generally observed at a certain stage of acute iritis; and in the course of the disease it will be further remarked that the colour of the iris becomes, and often remains, materially changed; if originally blue it has become green, and if naturally dark-coloured it has acquired a reddish or reddish-brown tint. This effect is owing to nothing more than the admixture of coagulable lymph with the proper substance of the iris—the union of these two substances produces this change, this modification of colour.*

It will be remembered that when directing attention to the anatomy of the iris, I spoke of two arterious circles which, from their situation, were termed pupillary and ciliary. These vascular circles are particularly involved

* I have twice seen the iris acquire a red appearance during the existence of iritis, it has appeared as though rendered beautifully and uniformly red by the aid of some subtle injection; in each of these cases, the opposite eye was of a blue colour. Similar instances are mentioned by Janin, Beer, Conradi, Robertson, and other writers on the diseases of the eye.

when the iris is inflamed, and they are actively engaged in the secretion of lymph when the inflammation has proceeded to an extent adequate to produce this effect of inflammation. So that in acute iritis it will be observed that the iris is discoloured, first, at the pupillary, and secondly, at its ciliary border—precisely in the situation of these two arterious circles; the intermediate space then becomes gradually discoloured, and eventually the whole of the iris. When the iris is acutely inflamed, its polish is first lost, its pupillary border becomes discoloured, then its ciliary margin, and finally, its entire surface.

State of the pupil.—The pupil is always in a contracted state in acute iritis compared with its usual condition, that is, presuming the eye to have been in a perfectly healthy and natural state prior to the attack, and I mention this circumstance on the following account:—if iritis take place in an eye affected with amaurosis, attended with enlargement of the pupil, or in that condition of the pupil termed mydriasis, you might be deceived by the enlarged state of the pupil, if you relied upon that circumstance as furnishing a decided diagnosis. Fortunately, however, the means of detecting iritis are sufficiently abundant, independently of the condition of the pupil, to prevent the risk of error. With this qualification I may again remark that the pupil is always contracted during an attack of acute iritis, independently of the formation of morbid adhesions to surrounding parts, unless indeed that disposition to contract be occasionally counteracted by artificial measures, such, for instance, as the local application of belladonna; and it may be desirable to inquire what is the cause of this contraction, and this disposition to contract in those cases where morbid adhesions do not exist? If the action of the iris depended mainly on the stimulus of light upon its surface,

it would not be expected that under a condition of inflammation, it should expand itself so as to expose an unusally large surface to the agency of that stimulus, which must, at such a season and under this notion of the cause of the motions of the iris, be particularly offensive and mischievous. But I do not entertain any such an opinion. The usual explanation of this occurrence under such circumstances, that is, prior to the formation of morbid adhesions, is, as follows:—The iris, acting in obedience to the stimulus of light upon the retina, is contracted during inflammation of its own texture, in consequence of that sympathetic irritability which the retina experiences during an attack of iritis. Upon this view of the subject, the pupil would appear to be contracted in order to protect the retina from the influence of light, of which, in consequence of its sympathy with the inflamed state of the iris, it is rendered increasedly and morbidly susceptible.

Let us now inquire if there exist any other circumstances connected with the iris itself which are adequate to explain this phenomenon. In the dilated state of the pupil, the vessels of the iris must be larger, more relaxed, and more tortuous, than during its contracted state; but as the contraction and expansion of the iris occur with extreme rapidity, those tubes, (I more particularly allude to the arteries) must be endowed with a very great share of elasticity; they could not for instance be removed from a state of great tortuosity and relaxation to a condition of comparative tension and straightness in a very sudden manner, unless their elasticity, or some property analagous to elasticity in its operation, was extremely great. Now what will be the effect of an *expanded* state of the iris upon that condition of its vessels attendant upon a state of inflammation? They will surely become elongated, their calibre diminished, and their anastomotic communi-

cations will be rendered less numerous and considerable by the comparatively diminished size of the larger series of vessels from which they arise. If you will carefully reflect upon this subject, you will, I think, admit that the arteries of the iris during its expanded state will be placed in circumstances more favourable to the resistance of inflammation than when that membrane is drawn towards its attachment to the ciliary ligament.

Thus then it will be perceived that three useful objects are attained by this contracted state of the pupil; which are, 1st, an impediment to its full and complete and extreme movements;—2ndly, a protection to the retina, which is at this period peculiarly susceptible of the stimulus of light; and 3rdly, an obstacle to the free admission of blood into its arteries.

It is a fair question how far the mere contracted state of the pupil is owing to the deposition of lymph among the fibres of the iritic substance, (which sometimes happens in the course of iritis, attended with a contracted state of the pupil unassociated with any morbid adhesions) how far this phenomenon is dependent on that *opposition to the action* of the true iritic structure which the *pressure* of lymph so deposited would produce. It can readily be imagined that lymph effused in a sufficient quantity to change the colour of the iris may so far press upon its proper texture as to impair its mobility, or even to destroy altogether its power of action; and that the continuance of that pressure may, by producing partial absorption of that texture by which the motions of the iris are performed, lead to that sluggish state of the iris which so generally *accompanies*, and in a few instances *remains after*, an attack of acute iritis not attended by any morbid adhesion to the capsule of the lens, to the cornea,

or to the opposing pupillary border. I may illustrate this occurrence, by referring to the phenomena which result from the excessive deposition of fat among or around the fibres of muscles; when a superabundant adipose deposition takes place either generally or locally, the muscles (presuming it to occur upon or among their fibres) are diminished in power and magnitude, partly by the additional pressure to which they are subjected, and partly by the increased absorption the pressure produced by this undue deposition, excites. And just in the same way does the deposition of lymph upon and among the fibres of the iritic substance produce, *first*, an impairment of its action, and, *secondly*, diminution of its actual volume.

In the progress of iritis, the iris, in addition to being contracted, undergoes various changes. Its pupillary border becomes thickened and inverted—it is turned towards the anterior capsule; its outline is no longer fine, definite and distinct, but is thickened, puckered, and irregular; the circularity of the pupil is destroyed, it is rendered angular and unequal, and is sometimes drawn from its natural situation, either upwards, downwards, or to either side, but more generally slightly upwards and towards the nose. The pupillary border may be tufted or fringed with lymph, or shreds of that deposition may be attached to its border; or a fine reticulated membrane, or a continuous film may exist in front of the anterior capsule, either in immediate contact with it or attached merely to the iris at various points of its pupillary border. As the disease progresses this film is rendered more distinct, it no longer consists, of a reticulated mesh-work —of fine shreds—of coagulable lymph, which pass in various directions from one part of the pupillary margin

of the iris to another, but it is a thin entire lamina of lymph, covering the anterior capsule, filling the pupil, and furnishing the medium for an organized adhesion of the iris.

Such then are some of the changes wrought in the state of the pupil by inflammation of the iris, and they vary from a slight degree of contraction and thickening of the pupillary border of the iris, to a fringed and tufted state of that border; to the formation of a reticulated meshwork of lymph passing across the pupil and connecting its opposing surfaces; to the formation of lymph cataract; and lastly, to the production of angularity of the pupil, closure of the pupil, synechia anterior, or, synechia posterior.

State of the cornea and aqueous humor.—At the commencement of iritis, the cornea and aqueous humor are not in any way affected, but even prior to its full development, the aqueous humor becomes more or less turbid, and contains, in some instances, where the inflammatory action has extended at an early period to its serous covering, those floating particles of lymph to which I have so recently adverted; and, when the inflammatory action leads to the secretion of pus, it is seen at the bottom of the anterior chamber, or when an abscess forms in the substance of the iris and bursts, its contents are discharged into the chambers of the eye, and as these abscesses almost always burst upon its corneal surface, the matter they contained subsides to the bottom of the anterior chamber, in the form, not exactly of a crescent, but in the figure of a body, the outline of which is expressed by the term plano-convex. Of course, I do not mean to say that an abscess of this description may not burst on the neural surface of the iris, and discharge its contents into the posterior chamber; for, this may occur and it may be suspected

that such an occurrence has taken place, when, during an attack of acute iritis, the iris, having, at its earlier stage, been particularly bulged forwards at one or more points at its upper or lateral parts, becomes afterwards projected towards the cornea at its most inferior part; the pain, at the time this change occurs, being suddenly and instantaneously relieved; for, I should have remarked, that the bursting of the abscess is always succeeded by a temporary suspension or relief of suffering.

The cornea is oftentimes slightly nebulous, at least its most internal lamina and the membrane lining it become so in the progress of iritis, chiefly by the extension of inflammation to its serous lining; and, in some instances, the cornea itself participates, particularly in strumous cases, so that these two diseases coexist, there is, in fact, *iritis* combined with *corneitis.* In other instances, ulceration may take place, and if it occur upon its neural surface it will generally be very limited, and will quickly heal under the influence of judicious treatment, but, during its existence, the characters of the aqueous humor will become modified by the secretion from the ulcerated surface, which secretion is very variable in its qualities; for ulcers of the cornea, like those in other parts, vary not only in their kind, but in the healthiness or unhealthiness of their condition, and the discharges from their surface are consequently modified; but when this secretion is of a purulent nature, it leads to hypopium; or an abscess may form in the interlamellar texture of the cornea, which may also burst, and discharging its contents into the anterior chamber may give rise to the same appearance, that is, to hypopium—spurious hypopium.

Intolerance of light; lachrymation, and pain.—In all cases of simple acute iritis, there will be a certain degree of intolerancia lucis, and its extent will vary in accord-

ance with the severity of the inflammation, its extension to other textures, the constitutional susceptibility of the individual, and indeed a variety of other circumstances which will readily suggest themselves. It will be remembered that I have referred this intolerance of light chiefly to the sympathy of the retina with the inflamed iris, and its consequent increased susceptibility to light.

There will also be an increased secretion of the lachrymal fluid, varying generally with the degree of intolerantia lucis; there may be merely a slight increase of the lachrymal secretion, not characterized (judging from the feelings of the patient) by any appreciable deviation from the qualities of ordinary tears; but in severe cases and during the height of the disease they are hot and sometimes very abundant, and the discharge is then termed "scalding lachrymation." Much, however, will depend on the condition of the patient's general health, and also on his constitutional susceptibility, for, tears capable of irritating the skin of one patient most severely will have no injurious influence upon that of another.

With regard to the pain usually present, that also will vary, in kind—in degree—and in the period of its recurrence. Sometimes it is very slight, and, in other instances, most tormenting; it is sometimes acute, throbbing and pulsatory; in other cases, it is a burning, smarting or darting agony; sometimes it resembles that sensation which firm pressure upon the eye-ball is known to produce; sometimes it exists around the orbit, in the face, eye-brow, and nose; and in other cases the patient will suffer chiefly from frontal and occipital pain, or from decided hemicrania. The degree of pain will, of course, vary with the severe or mild character of the iritis, the extension of the inflammation to other textures, and the constitutional characters of the patient. The pain in the simple acute

variety of iritis, is more constant, equal and uniform, than in any other, it is generally rather, but not much, worse during the night, and does not occur in that periodical manner which may be remarked in the arthritic and syphilitic forms of iritis.

Dimness of vision.—In acute iritis there will always be a certain degree of dimness of vision, produced in the first instance by the incapacity of the retina to sustain a proper degree of exposure to light for the purposes of distinct vision; and afterwards, by the cloudy state of the cornea, the turbid state of the aqueous humor, the contracted condition of the pupil, and frequently, at its latter stages, by the deposition of opaque matter either within the pupil or upon the anterior capsule.

Occasional combinations of disease with iritis.—An attack of iritis may supervene on various morbid states of the eye; for example, there may exist an opacity of the cornea, a cataract, amaurosis, the effects of a former iritic inflammation, and so on; and again, it may exist in combination with other diseases to which it may have given rise, such as, inflammation of any one or more of the textures of the eye, the more frequent of which are inflammation of the cornea and the choroid.

Constitutional symptoms.—There will generally be present during the existence of an attack of simple acute iritis, a feverish state of the system; the circulation will be quickened, the skin hot and harsh, the tongue coated, the appetite defective, the bowels irregular in their action, but more generally constipated, and, in short, there will exist a generally disordered state of the system, comprehended under the term, slight febrile excitement with derangement of the alimentary canal; but it is only necessary for me to state, that the constitutional symptoms which may accompany an attack of simple acute

iritis may be so urgent as to require especial attention, or they may be so slight as scarcely to merit notice.

Effects of iritis and its modes of termination.—I have already alluded to various morbid changes produced by the existence of iritis, but before I complete this part of my subject, I am desirous of saying a few words respecting the extension of inflammatory action from the iris to other parts. Inflammation of the iris may extend to the cornea, the choroid, the ciliary processes, and the retina, and may also be combined with so general an affection of the various membranes of the eye, as to constitute *ophthalmitis.* And without entering upon the consideration of the affection of those parts individually, I may state, that you will detect the extension of inflammatory action to the external textures by the increased vascularity of them, and will notice the extension of inflammation to the deep-seated parts by an aggravation of all the symptoms; as, for instance, increase of the pain, of the dimness of vision, of the intolerance of light, and of the lachrymation, and so on.

Inflammation of the iris may lead to the permanent contraction of the pupil; and this contraction of the pupil is usually attended either with the formation of a reticulated membrane within the pupil, or the more decided deposition of lymph to which the iris is adherent, and by means of which vision is totally destroyed. The iris may contract adhesions not only through the medium of bands passing from opposite sides of its pupillary border, but by means of organized lymph, effused either upon its own surface, or upon that of surrounding parts; and the usual effects of the organization of the lymph are, partial or total adhesion of the iris to the neural surface of the cornea, or to the anterior capsule; and these adhesions may take place, either by means of one or two filaments of

lymph, by a small portion of its surface, or by the whole, or nearly the whole, of its surface. The filaments to which I am now referring are most distinctly observed when elongated by subjecting the iris to the influence of belladonna. Again, the pupil may become occluded, not by the adhesion of the pupillary border of the iris to a mass of lymph occupying the site of the pupil, but by its union or accretion in the centre. In the progress of iritis the pupil may become gradually so much contracted as to meet—its pupillary border is drawn, is collected together as it were, in its centre, so that if you carefully examine the eye externally, the cornea itself being clear and uninvolved in the morbid changes, you will perceive that the iris is stretched completely across the chambers of the eye, and quite destroys the central communicating aperture (the pupil) which previously existed between the anterior and the posterior chambers. But in other instances it has not proceeded quite to so great an extent, there may remain an aperture not much larger than a pin's point, through which light may be transmitted in sufficient quantity for the purposes of tolerable vision, provided no diminution in the transparency of the parts behind or before, or on a level with, this small pupillary aperture, has been produced. In the former instance, that is, in the case of complete closure of the pupil (*atresia iridis completa*) the subjacent parts may be in a perfectly healthy state, and if you are fortunate enough to make an artificial pupil without exciting much inflamation by the operation, the patient may still be enabled to see tolerably well. This then affords satisfactory evidence that the iris may be acutely inflamed independently of surrounding structures, or, at least, without implicating them so far as to lead to any visible or discoverable morbid change in their natural properties. In those cases where the chambers of the eye are nearly filled either with pus

or lymph, the cornea may be expected to be injured, and there may occur, as a consequence of this state of things, either extensive ulceration or staphyloma of that part. I have observed in a few cases that the pupil has been nearly circular but much dilated, after an attack of iritis, and that it has remained permanently dilated, and that it has never afterwards been capable of contracting to any great extent even when the eye has been subjected to a very intense light, and in such instances the edge of the iris has been thickened, and I have presumed that the circular fibres which are situated at its pupillary margin have been paralyzed by the inflammatory process.

Causes.—This form of iritis is not unfrequently produced by local injury; for instance, a blow upon the eye, laceration of the iris, contusion or puncture of the eye, especially by the various operations for cataract, and by the whip of a wheat-ear in reaping, or from a common hedge twig. Employing the eyes in the inspection of various minute glittering substances, particularly by gas-light, examining distant objects by the aid of powerful glasses, more especially intensely luminous bodies, have all been mentioned among the causes of simple acute iritis; it appears that any over-exertion, any undue or prolonged effort on the part of the eye, whether by natural or artificial light is capable of producing the disease. I cannot point out any class of persons who are more obnoxious than others to idiopathic iritis, and, in many instances, I have not been able to ascertain, in a satisfactory manner, any efficient cause for its occurrence in persons in whom it has taken place, and who have, in consequence, placed themselves under my care. In many instances it is impossible to point out the particular circumstance which determines the inflammation to the iris in preference to surrounding textures.

Diagnosis.—I have already pointed out the means of distinguishing inflammation of the iris from that of inflammation of the membrane of the aqueous humor, (page 590) and in future chapters of this *Treatise* it is my intention to refer to the method of discriminating the inflammatory affections of the choroid and the retina from those of the iris. The only other diseases with which iritis is liable to be confounded are *corneitis* and *capsulitis.* When the cornea only is inflamed the zonular arrangement of vessels around its margin is less distinct—it is less intensely red; and there is not that white line around the margin of the cornea and between it and the vascular wreath, which may be generally observed in a more or less perfect degree in pure iritis. When the cornea only is inflamed the pupil is not so much contracted, it is more influenced by varying degrees of light, and has not undergone those changes in its figure or deviations from the perfection of its outline, as may be remarked in inflammation of the iris; and, moreover, the eye is less painful and less intolerant of light. However, as the cornea is pretty generally and somewhat peculiarly nebulous in *corneitis,* and is scarcely or not at all affected, as regards its transparency, in *iritis,* it is not always an easy matter to ascertain the condition of the pupillary aperture during the existence of acute inflammation of the lamellar texture of the cornea. Iritis and corneitis are sometimes co-existent, but rarely in an equal degree, and when this takes place the predominant will be readily distinguished from the lesser and milder affection, by a careful examination. To enable us to discriminate with absolute precision and accuracy, it is necessary to group together the symptoms of each malady, as they are exhibited in a pure, acute and strongly marked example of the two diseases, and by placing them in contrast there will be little difficulty in deducing a correct diag-

nosis. When a slight degree of corneitis supervenes on iritis, or when the latter disease occurs where corneal opacity is present, or where previous disease has affected the integrity of the organ of vision, it may be more difficult to determine the precise nature and degree of the more important affection.

Inflammation of the crystalline capsule is distinguished from iritis by various symptoms. The zonular arrangement of vessels around the corneal margin is much less distinct; the polish and colour of the iris are scarcely at all affected; the form of the pupil is unaltered, it is less contracted but more turbid, and there is much less intolerance of light. If the pupil is carefully examined, the inflamed capsule will be found slightly opaque in various parts, it will be irregularly dotted or marbled—veins or streaks of opaque matter in various degrees of distinctness will be present. In short, the symptoms of *capsulitis* as contrasted with those of *iritis*, are much milder—there is present less pain, less tension of the eyeball, less intolerance of light, &c.; it establishes itself more slowly, and is less readily influenced by treatment—the kind and activity of treatment, which so generally and readily influences iritis, operates upon capsulitis much less promptly and evidently. A certain degree of iritis usually attends the completely established form of capsulitis, so that it is only at an early period of this affection, that its own proper characters are present—are maintained in a state of absolute integrity.*

* " Mais la phlegmasie de cette membrane ne se termine pas toujours de cette maniere; un épanchement de lymphe qui a lieu frequemment entre l' iris et la capsule du cristallin produit l' adhérence de ces parties; il est douteux néanmoins que la capsule participe à l' état primitif de l' inflammation, car j'ai plusieurs fois remarqué, en observant des adhérences entre l' iris et la capsule du cristallin, que les vaisseaux

When treating of arthritic, syphilitic, and strumous iritis, I shall mention those circumstances which it is necessary to bear in mind for the purpose of enabling us to distinguish those varieties of iritic inflammation from each other and also from simple acute iritis.

Prognosis.—The prognosis will be regulated by the period at which we have an opportunity of first witnessing the malady; for instance, if called in at an early stage, before the extension of inflammatory action to other parts has occurred, and before the effusion of lymph or pus has taken place to any great extent, and before the iris has acquired any morbid adhesion to surrounding parts, we may pronounce with tolerable confidence a favourable prognosis. But, if the inflammation has extended to the deep-seated textures, or has been allowed to remain sufficiently long to produce a free secretion (either of pus or lymph) into the chambers of the eye, or to block up the pupil by the formation of an adventitious membrane, or to produce morbid adhesions of the iris to neighbouring parts, it is right to express an opinion of the result with great caution; for, although a certain degree of vision may be restored, yet we cannot say positively that such will be the case, we cannot calculate upon the beneficial, the controlling, agency of treatment under such circumstances, with the same degree of certainty and confidence as in the former instance. Much indeed may be effected in some of the worst, and apparently most hopeless cases by decisive and judicious treatment, for there is scarcely any disease in which the action of remedies is so evident and

venaient principalement de l'iris; et c'est un fait de pratique bien démontré aujourd'hui, que lorsque deux surfaces adhèrent par suite d'inflammation, la plus grande partie des vaisseaux proviennent de celle qui a été primitivement enflammée." Guillié in *Dictionaire des sciences médicales.* Tome 26, p. 89.

so satisfactory as the present; so that, although it would not be right on the one hand to omit an attempt to save the organ when called in at a late period, and under very discouraging circumstances, from a paralysing impression of the inutility of all remedies; on the other hand, it would be most desirable to be guardedly cautious not to over-rate the efficacy of remedial means from a too sanguine conviction of their power and usefulness, and excite, in consequence, those expectations in the mind of the patient and his friends which may never be realized. I remember being requested by a medical friend to see a case of iritis in which lymphatic deposition upon the anterior capsule had just commenced, I hoped to control it by the administration of mercury, but the patient could not bear it in any form or in any quantity, she would not submit to have leeches applied to the palpebræ or the temples, and as all other remedies failed to arrest the disease, her vision was totally destroyed. We may then decide *favourably* respecting the result of iritic inflammation prior to the occurrence of any *morbid change*—any of the effects of iritis, if the patient is in a condition of health to permit the employment of active treatment; *doubtfully*, when lymphatic deposition has taken place to any great extent, the other textures of the eye being scarcely, or not at all, involved in the inflammatory process; and *unfavourably*, if the inflammation has extended to the textures of the eye generally, or if lymphatic deposition exists in large quantity, has been deposited so as nearly to occlude the pupil for some time, and has acquired a certain degree of organization; still, knowing the great efficacy of mercury in promoting the absorption of lymphatic deposition, we ought not, even where the lymph was obviously organized, to omit to give the patient the chance of any measure of benefit the administration of that medi-

cine might confer; for it must not be forgotten that newly organized—recently vitalized—parts, possess a much more feeble share of vitality than those structures which constituted—originally constituted—a part of the living system, and are therefore much more under the influence—much more readily acted upon—by the absorbent power of mercury.

Treatment.—Although I have represented that this variety of inflammation of the iris is an acute affection of an internal and one of the most vascular textures of the eye, yet it may be as readily removed and as speedily arrested as almost any form of inflammation to which the various textures of this organ are liable. And the success with which we are enabled to conduct the treatment of such affections is not owing merely to our capacity to distinguish the disease by the aid of vision at an early period of its existence, in consequence of the transparency of the textures anterior to it and the very obvious manner in which it is indicated by a great variety of very characteristic symptoms, but also to our acquaintance with remedies which operate with great efficiency and certainty.

If called to a case of iritis occurring in a strong plethoric subject, before the full development of all its characters, you would at once deplete with a freedom proportioned to, and regulated by, the strength of the patient and the severity of the symptoms, and it would in some instances be advisable to follow up this general bleeding by the application of leeches to the lower lid. At the same time you would prescribe an efficient purgative of calomel and jalap, and keep down the vigour of the circulation by enjoining abstinence and by administering nauseating doses of tartarized antimony. By the aid of treatment such as this, adopted at an early stage of the disease, you will frequently be enabled to prevent the *full development*

of acute iritis; you will arrest it at its commencement, and before the symptoms have acquired strength by continuance, and before any morbid—any structural changes have taken place. With a due knowledge of the characters of the disease and with an acquaintance with its tendency to impair the transparency of textures, whose transparency is essential to vision—with a knowledge of these facts, you would not long delay the administration of that remedy we are about to recommend, as possessing an extraordinary power of arresting iritic inflammation, that is, if the inflammation be acute and do not yield to antiphlogistic remedies alone. You will not often be fortunate enough to witness these cases thus early, (for the symptoms of acute iritis are not long in assembling) but will more frequently have to contend with a well-marked and fully-developed case of iritis, or one in which there are present either indications of an extension of morbid action or the *effects* of the iritic inflammation. It is to cases such as these that my observations on the following remedial measures chiefly apply.

Bleeding.—With symptoms of general febrile excitement, with great local pain and inflammation, occurring in a strong phlethoric subject, it would be desirable to bleed from the arm, and to repeat the bleeding in a few hours, if, on a trivial abatement of local pain and inflammation immediately after the first venesection, these symptoms recurred with their original severity. But I can scarcely advise the application of leeches, unless the disease is in a chronic state, or unless the symptoms are very slight, or the subject in whom they occur very feeble; for, if you apply them at the commencement of the disease in its acute form, and rely upon them in the expectation of deriving through their medium those advantages which result from a more copious and prompt detraction of

blood, you will permit the loss of that time when alone active and decisive treatment possesses the power of preventing injurious effects upon vision; and, if you apply them after having premised general bleeding, the eye is necessarily exposed to a greater or lesser degree of light, and the patient is much annoyed during their application, independently of the hazard of producing that inflammation and tumefaction of the lids and chemosis which, with the state of health usually attendant upon iritis during its treatment, is so apt to occur after leeches have been applied near the palpebral margin. Bleeding is the first and most important of the remedial measures to be employed in the subduction of simple acute iritis, but I cannot say that my experience has hitherto induced me to rely upon it to the same extent as some surgeons would appear to do, on the contrary, I am in the habit of employing it rather as a preparative measure to the adoption of more effective means, than as one possessing in itself a capability of controlling the action of the capillary vessels of the iris, which alone can effectually arrest that disorganizing action, so generally associated with a certain stage of an acute inflammation of the iritic texture. I am satisfied that many cases of acute iritis may be perfectly cured by the employment of mere antiphlogistic measures, for I have myself successfully conducted the treatment of such cases by their assistance alone, and there is abundant evidence to the same effect in the writings of Guillié, Saunders, Rose, Thomson, and Lawrence; but if you rely on these measures simply, as the general rule of practice, you will, admitting their occasional capacity to accomplish a cure, frequently have to regret the needless occurrence of effects seriously detrimental to vision. It will be understood that active antiphlogistic measures will sometimes cure simple acute iritis without

the aid of mercury, and will generally limit the disorganizing effects that disease has a tendency to produce.

Purgatives.—Without relying upon the agency of purgative medicines as an essential part of the treatment, I usually prescribe an active dose of calomel and jalap, to be taken immediately—as the commencing part of the plan of treatment—under a confirmed impression that in those instances where I have had recourse to this practice, I have been less frequently obliged to discontinue the use of mercury afterwards from its injurious operation upon the health, or its annoying influence upon the stomach and bowels; but having administered one ample dose, I carefully abstain from the further use of purgative medicine, unless called for by the existence of peculiar symptoms.

Mercury.—When you have freely bled a patient affected with iritis and administered an active dose of calomel and jalap, I should advise you to commence the use of mercury in one of the following forms. Administer, according to the stage and duration of the disease and the constitutional circumstances of the patient, two or three grains of calomel with half, a quarter, or a third of a grain of opium, every two, three, four, or six hours; and, of course, all other things being equal, the greatest quantity administered in the shortest space of time will be particularly called for where the disease has proceeded to the deposition of lymph or pus, and has led to the contraction of the pupil and discolouration of the iris. But the patient may not be able to take it in this form, and in very delicate habits it may be better to administer the hydrargyrus cum creta, calomel and Dover's powder, or blue pill combined with opium. In these latter forms you will often be enabled to administer as much hydrargyrus as may be necessary to excite its specific effect, where it is most desirable that such an effect should be produced, but

where, at the same time, it cannot be produced by the more usually employed formula. And you may also have recourse to the infriction of mercury where its internal administration cannot be borne;—you may direct the strong mercurial ointment combined with opium to be rubbed upon the inner side of the arms or thighs.

The effect of mercury upon the inflamed iris may be observed to be most decisive and satisfactory in its operation; for, (in favourable cases) under the influence of mercury, the redness around the cornea becomes paler; the zonular arrangement of vessels less perfect and distinct; the pain diminishes; the dulness of the iris, the cloudy state of the cornea, and the turbid condition of the aqueous humor are sensibly diminished; vision improves; lymphatic depositions and purulent effusions are removed; and lastly, the colour of the iris and its proper mobility are restored. These are the changes which may be observed to be gradually taking place in the symptoms connected with many cases of acute iritis, when the system is placed under the decided influence of mercury; but if administered short of the production of this effect—if prescribed in small quantities called, *alterative doses*—no salutary changes of this description are produced; on the contrary, whilst we are administering *alteratives*, the *disease* is *altering* and *destroying* the important textures of the eye.

As regards the preservation of the perfect integrity of the textures of the eye, you cannot affect the system too soon, and, I repeat, that nothing in therapeutics or pathology can be more interesting or more satisfactory, than the observance of the decisive changes wrought on the symptoms connected with acute iritis by fully placing the system under the mercurial influence.

You may be called to a case in which the symptoms

may have been allowed to continue so long that the iris may be greatly contracted and completely discoloured, the pupil may be filled with lymph, or hypopium may exist in its extremest degree, and you might perhaps, from such an assemblage of events, be tempted to believe that the case had proceeded too far to admit of a cure; but do not hastily distrust the powers of mercury, try it in conjunction with the local application of belladonna, and you will frequently derive from its use, even in these wretched cases, the most pleasing, and until well acquainted with its capacity to remove effused and imperfectly vitalized substances, the most unexpectedly beneficial results.

But it may be asked when does mercury cease to be useful? This is indeed an interesting question, and I am not aware that any specific time after the subsidence of active inflammatory action can be mentioned as constituting the particular period after which the administration of mercury ceases to be advantageous. In all recent cases where, although the acute symptoms have subsided, their effects (such as, preternatural adhesions of the iris to the anterior capsule, patches or masses of lymph upon the iris, within the pupil, or upon the anterior capsule) remain, I should most certainly attempt their removal by the use of mercury, for, although such depositions, if permitted to remain, eventually become organized, and although the process of organization commences very soon after the inflammation which produced the deposition, has subsided, yet even under the supposition that they are already partially organized, we may expect to arrest the organizing process, and to produce at least their partial absorption. Recent lymphatic deposition which has only been partially organized, and which therefore possesses merely a very feeble degree of vitality, may be removed either wholly or in part by placing the system under the full and decided

influence of mercury. However, mercury would cease to be useful when adhesion of the iris to surrounding parts, or when lymphatic deposition, has existed for many months; or, at all events, the very little advantage to be obtained under such circumstances, would be scarcely sufficient to repay the patient for the inconvenience and the temporary injury he would sustain by passing through a mercurial course. I have seen the iris so covered with masses of lymph as to be nearly obscured, vision has been quite destroyed, and the eye has been apparently totally lost, yet under the influence of mercury, the lymph has been gradually absorbed, and vision has been restored, and this leads me to remark that as soon as this degree of amendment has taken place the particular influence of mercury upon the iris ceases—it does not go on to absorb the natural texture of the membrane, and its action has, so far, no longer a local sphere of operation.

As regards the time at which the administration of mercury ought to be discontinued, I may mention that, it is generally advisable to affect the mouth most decidedly in all acute cases, and to discontinue the use of mercury as soon as such a decided effect is produced; but if the symptoms, which at first rapidly declined as soon as the mouth became affected, appear afterwards disposed to remain stationary or to increase, you would again use the hydrargyrus in more sparing quantity, and continue its use to the maintenance of a slight tenderness of the gums until the evidences of iritis had totally disappeared. But this long-continued administration of mercury will rarely be necessary, for, in nearly every instance of acute idiopathic iritis, the symptoms will rapidly decline as soon as the action of the hydrargyrus upon the system is rendered decisively evident. I do not mean to say that you would recklessly administer calomel and opium every two or three

hours until the gums are rendered spongy and the patient is completely salivated, in every case of acute iritis; but presuming the subject of the disease to be moderately strong, to possess no constitutional or other peculiarity rendering the free use of mercury inadmissible, and to be suffering from a true acute idiopathic iritis, I should strongly recommend its administration in frequently repeated doses, until the mouth is fully affected, believing that no effect short of this is competent to remove the disease in that prompt and thorough manner which our present acquaintance with the powers and qualities of remedies justifies us in asserting, may be accomplished; and having produced this effect, as the influence of mercury when fully excited remains for some time after its administration has been discontinued, I should not, as a general rule, recommend that its use be continued beyond this period.

I have already stated that mercury is not absolutely necessary for the cure of every case of acute iritis, and have mentioned that SAUNDERS,* LAWRENCE,† and more particularly MR. ROSE,‡ DR. J. THOMPSON,§ MR. GUTHRIE,‖ and MR. CARMICHAEL,¶ have cured this disease even when occurring in connexion with syphilis, without the employment of any hydrargyrus whatever, but if you will carefully read the opinions of MR. LAWRENCE, whose work embodies a valuable store of information respecting the influence of mercury in iritis, you will be convinced that

* *A Treatise on some practical points relating to Diseases of the Eye.* London, 1816.

† *A Treatise on the Venereal Diseases of the Eye.* London, 1830.

‡ *Medico-Chirurgical Transactions,* Vol. 8.

§ *Edinburgh Med. and Surg. Journal.* Vol. 14.

‖ *Medico-Chirurgical Transactions.* Vol. 8.

¶ *Observations on the Efficacy of Turpentine in the Venereal and other deep-seated Inflammations of the Eye.* Dublin, 1829.

in attempting to cure fully developed iritis without mercury you endanger the occurrence of effects most detrimental to vision, and are frequently compelled to have recourse to it at last; and you will also discover that the duration of treatment is much more prolonged, when, rejecting mercury, you rely upon antiphlogistic remedies alone. On the other hand, Dr. Farre has perhaps extolled the beneficial influence of mercury to an *injudicious extent*, in stating that the "mercurial action *alone*, when properly kept up, is sufficient to subdue the ophthalmia iridis in its most acute stage."* I am satisfied that whatever may be the utility of mercury when unassisted by other remedial measures, iritis is more promptly arrested, and the effects it has a tendency to produce much less frequently occur, and when they do occur, take place to a much less extent, when free venesection—when the free abstraction of blood—has been practised prior to its administration; and you will be aware that if the loss of blood merely placed the system in a more favourable state for the operation of mercury it would still be a most judicious adjunct to this admirable remedy.

Viewing the decidedly beneficial influence of mercury upon the inflamed iris, you might be induced to believe that it had some peculiar or specific control over the inflammation of that texture, different from that which obtains in inflammation of many other parts of the body; but I do not see that we require more than an admission of its modifying or controlling influence over the action of the capillary system in general to explain its useful operation in the case before us. If you inquire how mercury acts upon an inflamed iris, I must reply, that it has

* See his prefatory remarks to the second edition of Mr. Saunders' *Treatise*, page 38.

the same effect upon the capillary vessels of the iris under that state termed inflammation, which it possesses over the capillary system of many other parts under the same condition (inflammation) of disease.

It is supposed by some surgeons that the local application of mercury—mercury applied directly to the inflamed part—is very useful in iritis. Professor BEER has recommended one or two applications of this description. "Calomel," says BEER, "united with opium is to be given internally, and in conjunction with tonic medicines, as the calamus aromaticus, bark, &c. Externally, a solution of *corrosive sublimate* in water, to which mucilage and a considerable quantity of vinum opii have been added, produces at first great benefit, and when this loses its effect, or the eye cannot bear any fluid application, which is sometimes the case, then a small quantity of a salve composed of two drams of fresh butter, six grains of *red precipitate*, and eight grains of the extract of opium, should be daily inserted between the eye-lids." If it be intended by any applications of this kind to assist the mercurial action, produced by the administration of hydrargyrus as previously recommended, there can be no doubt respecting their inefficacy, and I have no hesitation in saying that remedies of this description are always useless and frequently mischievous at the period at which BEER advises their use—that is, in the progress of acute iritis—on account of their stimulating qualities.

However, the same objection cannot be made to the friction of mercurial ointment blended with opium, above the eye-brow, in those instances where there is severe frontal pain, particularly when it is seated in the supra-orbitary nerve and its branches, on the contrary, I am not acquainted with a more judicious and certain method of relieving this description of suffering; and, as the pain is

generally most severe during the night, the patient may be recommended to rub upon the skin immediately above the eye-brow every evening, a small quantity of mercurial ointment to which a grain or more of opium has been added. Beer recommends this practice for the purpose of contributing to the absorption of the lymph effused into the posterior chamber, which, it appears to me, may be much better effected by the internal administration of blue-pill or calomel. However, we must select from among the various preparations of mercury that which the particular circumstances of individual cases may appear to render most suitable.

There are patients possessing such peculiarities of constitution that they cannot bear the administration of mercury, there are others so feeble that in them its use would be excessively mischievous, and in such cases it is pleasing to know that we possess a remedy capable of arresting inflammation of the iris, even where it may be combined with severe pain in the head and other acute symptoms. We are indebted to Mr. Carmichael of Dublin, for having discovered the decisive utility of turpentine in iritis, and particularly in the syphilitic form of iritis.*

Tartar emetic and other medicines capable of lowering the power of the circulation, were formerly administered before the general introduction of mercury in the treatment of this disease, but nauseants are now seldom

* Mr. Carmichael only recommends the employment of turpentine in those cases of iritis where it is considered unadvisable to administer mercury. He has recorded many well-marked instances of the disease which were promptly and completely cured by the use of turpentine. I subjoin the formula he generally adopted :—℞. Olei terebinth. rectificat. ʒ i. Vitellum unius ovi. Tere simul et adde gradatim, Emulsionis amygdalarum ʒ iv. Syrupi corticis aurantii ʒ ii. Spiritus lavandulæ compositi ʒ iv. Olei cinnamomi guttas tres vel quatuor. Misce. Sumat cochlearia larga duo ter de die.

employed and ought not to be used conjointly with the mercurial plan of treatment.

You may apply blisters over the eye-brow or behind the ears after the acute symptoms are subdued, but if you commence their use too early they will be exceedingly injurious. In fact, blisters are not to be employed until the acute symptoms have been subdued, and when applied *for the first time* during the existence of any particular attack are not to be placed *very near to* the inflamed eye.

Collyria and fomentations may be used at any stage of the disease, but their use is by no means important, and they are rarely required at all until the more severe symptoms have been diminished. If there be much pain in and around the eye-ball you may suggest a poppy fomentation or some mild narcotic lotion, but you must not consider such applications as in any degree rendering unnecessary, the adoption of active measures.

At the latter stage of those cases where the symptoms have been very severe, and have continued for an unusually long period, and where in consequence the eye remains irritable, and the vascular circle around the cornea becomes merely less distinct than it was during the severity of the disease, you may have recourse to a slightly stimulating lotion, such, for instance, as the diluted vinum opii, to restore the tonicity of the more superficial vessels; regarding the outward redness which exists at this period of the disease, not so much a condition of inflammation, as the result of the loss or impairment of tonicity and elasticity from prolonged and excessive distention. In adopting this practice you will be careful to observe that all *active inflammation* is subdued, and will take care to discontinue the slightly stimulating applications, if they evince any tendency to re-excite the former state of disease; for it will not be forgotten that the

vascular system of any part recently affected with inflammation, and which remains in an enlarged, because in an atonic, condition, in consequence of the severity or the duration of the inflammation, readily accepts and permits a recurrence of the same morbid process.

Belladonna.—The application of belladonna to the eye-brow has been long known as a very useful mode of preventing that contraction of the pupil which too often results from acute iritis.

In employing the belladonna locally, you will bear in mind that it has not only the power of preventing that contraction of the pupil which might otherwise occur, but that even when it has become much contracted, and the iris has acquired slight adhesions to the anterior capsule, or, by means of frenulæ, to the opposing margin of the pupil, it will, in some instances, produce its full enlargement, and destroy the lymphatic adhesions, particularly when the administration of mercury is at the same time employed. You will be aware of the extremely powerful influence of belladonna in enlarging the pupil, when I state, that in several instances which have fallen under my observation in which the pupil has been extremely contracted, and its surface adherent to the anterior capsule through the medium of recently effused lymph, the persevering application of belladonna has detached it from its lymphatic connexions, leaving behind, as distinct evidence of the fact, the uvea—the pigment which in the healthy state of the iris is secreted upon its neural surface. Regarding this application as being extremely useful in counteracting the tendency to contraction and closure of the pupil and in preventing other effects of inflammation of the iris, I am in the habit of advising its use during the whole period of *acute* iritis; not that it possesses any important influence upon that part during the established

existence of inflammation, for I am well aware that it is only *before* the acute symptoms are fully developed, and on their subsidence, that its action is evident—its influence decided, but by continuing to employ it throughout the whole course of the disease, it has an opportunity of acting as soon as the iris is susceptible of being influenced by its operation, and I am persuaded that without its assistance, the tendency of this variety of inflammation to induce contraction of the pupil would be much more frequently observed, and that to a greater extent. I do not advise you to form the belladonna into a solution and drop it into the eyes at particular intervals, for that will have an injurious effect upon the inflammation which is present; but you may obtain its full effects by smearing it upon and above the eye-brow. You would weaken the extract of belladonna by the addition of two parts of the unguentum cetacei, and smear this weakened extract, about the thickness of a half-crown, above and upon the eye-brow every evening, and this may be done after the mercurial ointment has been rubbed in for the relief of supra-orbitary pain.*

Very different views have been taken of the mode in which the local application of belladonna effects the expansion of the pupil. Mr. Saunders distinctly states

* I cannot omit this opportunity of drawing attention to the great power of that part of the true iritic structure which causes the dilatation of the pupil, as evinced by its capacity to detach the neural surface of the iris from its lymphatic adhesion to the anterior capsule. It may be observed that this lymph, if not very recently deposited, becomes softened under the influence of mercury, and that then, the fibrous—the peculiar structure of the iris, comes into operation, and effects the full expansion of the pupil, and as this takes place, the extension of the plastic lymph which constitutes the medium of adhesion may sometimes also be witnessed. Unquestionably the lymph is softened before it is absorbed, and this process of softening is, if I may be allowed the expression, *a means of preparing the lymph for absorption.*

that it acts upon the *radiated* fibres of the iris, induces them to contract and to draw the iris towards the ciliary ligament, and he reasons upon this fact, if indeed it be one, as though by asserting the statement he had proved it beyond the hazard of a doubt. Professor HIMLEY, on the contrary, who, in the year 1801, published some remarks on *Paralysis of the iris by the local application of hyoscyamus, and the use of this remedy in the treatment of some diseases of the eye*, believes it to operate by inducing paralysis of the iris.

In connexion with the view of this subject taken by MR. SAUNDERS, I may state that it is a prevailing idea, but not by any means an established fact, that the diminution in the size of the pupil is effected by a series of circular muscular fibres, situated around the pupillary border of the iris, whilst its enlargement is caused by the contraction of a series of radiated fibres, passing in infinite numbers from the pupillary border of the iris to its termination in the ciliary ligament. Now you will not fail to remark what a high degree of elasticity these radiated fibres must possess, in order to change the pupil, with the rapidity we observe to occur, from a state of extreme contraction to one of great dilatation, and that too without being rendered evident by the slightest outward indication of their existence, by any inequality in the surface of the iris, or by irregularity in the pupillary border. In order to overcome the action of fibres so powerful as that of the radiated fibres of the iris, according to this view of the subject, how great must be the power of the circular or orbicular fibres of the iris? But granting that MR. SAUNDERS is correct; admitting that the influence of belladonna upon the iris is the mere inducement of contraction on the part of its radiated fibres, how is its action thus limited? By what means is its influence

rendered thus partial, and in what manner is it prevented from acting upon the orbicular fibres of the iris at the same time? If it be admitted that the influence of belladonna is exerted upon every part of the iris equally, that it extends to the circular as well as to its radiated fibres, it must at least be allowed that its radiated fibres are more powerful than its circular ones, and presuming all these things to be proved—that is, 1, the distinct existence of radiated and orbicular fibres in the iris;—2, the greater strength of the former compared with the latter;—3, the expansion of the pupil in consequence of the contraction of the radiated fibres, and its diminution by the contraction of its orbicular fibres; and 4, the capability of belladonna to produce the uniform contraction of all the radiated fibres at the same time—then the reason of the dilatation of the pupil by the agency of belladonna, is clearly explained. If the movements of the iris are effected by means of a structure possessing the property of contractility, elasticity or muscularity, and if the influence of belladonna operate equally upon every part of that texture, we must admit, according to the accepted arrangement (radiated and circular fibres) of the contractile, elastic, or muscular parts of that structure, that its radiated fibres are more powerful than its orbicular ones.

SECTION II.—CHRONIC INFLAMMATION OF THE IRIS.

Independently of that chronic state of disease which may be left by the natural subsidence of the more severe symptoms of acute iritis, there may exist an inflammatory state of the iris, which, from the slowness of its progress, the tardiness of its development, the mildness of its symptoms, and the period of its duration, may, with perfect propriety, be termed *chronic iritis.*

This form of disease has been supposed to arise not unfrequently from some injury the eye sustains in performing the operation of keratonyxis, and some years ago Dr. Schindler wrote a pamphlet on this subject, under the following title;—*Commentatio ophthalmiatrica de Iritide chronica ex Keratonyxide suborta;*—but I do not think the disease he has described is well characterized by the title he has adopted, and does not at all agree with my views of chronic iritis as I shall presently explain them.

The peculiarities by which chronic inflammation of the iris is distinguished from acute inflammation of that membrane are numerous and important: its symptoms are much less acute, and although it may, if uninterrupted, eventually lead to those changes in the pupil and the iris which we have represented as sometimes resulting from acute iritis, yet such effects are less frequently produced, and do not take place to so great an extent, and are very slowly accomplished. Its development also is more tardy; the symptoms of acute iritis are very rapidly developed, for, in the course of twelve or fifteen hours, they may all of them be present in a pretty decided form; but, in the chronic inflammation of the iris, they occur more slowly, the vascular arrangement around the cornea is of a pale pink colour, it is not an entire, but if I may be allowed the expression, an imperfect and interrupted circle; the dulness of the cornea, the cloudy state of the aqueous humor, and the dulness of the iris are present, but not to so great a degree, nor are they so rapidly produced; the pupil gradually contracts, becomes puckered and thickened, and its pupillary margin becomes irregular; and these changes do not take place suddenly and quickly, but slowly and gradually. Neither the pain, nor the intolerance of light, nor the increased lachrymation exist to so great an extent as in the former variety of this affection, and the power of vision is much less seriously impaired

for some time after the continuance of the disease. This impairment of vision may come on so insidiously when one eye only is affected, that I have known the sight of the organ to be nearly destroyed, before the patient has been aware that any thing has been the matter with it, but when this has taken place—when the disease has proceeded to this extent—the other eye becomes affected and dim, and then indeed the patient discovers that he has lost the sight of one eye, so that it will be imagined the disease is not characterized by much pain.

There is one circumstance which it is right to be acquainted with as belonging to the history of chronic iritis, when it is not a second stage of the acute form of inflammation of the iris,—namely, the change in the colour and polish of the ciliary margin of the iris, before its pupillary border is so changed in colour, which is, in fact, exactly the reverse of what occurs in acute iritic inflammation; however, I have many times known vision quite destroyed by the continuance or recurrence of chronic iritis, which has been characterized by lymphatic deposition or closure of the pupil, unattended by much positive change in the colour of any part of the iris.

You will regard this disease as for the most part a mild type of the former affection (simple acute iritis), which only leads to the same injurious effects upon vision when frequently repeated or when permitted to continue unchecked for a long period, and which may remain many weeks before any consequences materially detrimental to vision, are produced. You will regard it, however, as inflammation, the continuance of which may give rise to very mischievous effects; and knowing that it has a tendency to produce the effusion of lymph, the contraction and closure of the pupil, and adhesion of the iris to surrounding parts, you would employ, without loss of time,

those remedies which were recommended for the cure of simple acute iritis. But it would not be necessary to bleed to the same extent, and then, in the general, you would only deem it advisable to remove blood by the application of leeches to the temple or to the lower lid; nor would you employ mercury with the same freedom as in the treatment of the former affection. You would effect the system more slowly, administering perhaps five grains of the blue pill every night and morning, so as to act upon the gums slightly; and this effect it would be desirable to maintain so long as the evidences of inflammation continue, until indeed the vascular zone around the cornea disappeared, and the translucency of the cornea and aqueous humor were restored, and the polish and free mobility of the iris returned.

Counter-irritation is in such cases highly useful; you may apply blisters either above the eye-brow, or to the temple, or at the back of the neck, and maintain a discharge from the blistered surface by dressing it with the savine cerate; or, you may place a seton in one or both temples as one or both eyes may be inflamed.

The application of belladonna to the eye-brow would also be advisable, for here, as in the former instance, there exists a tendency, on the part of the iris, to contract, and to acquire adhesions to surrounding parts. It is true that permanent contraction of the iris and adhesion to neighbouring structures, does not frequently take place, but do not allow such an occurrence to take place even rarely whilst you have the means of preventing it altogether, that is, if you will employ them in all cases, though they may be required only in a few. Of course I am merely referring to those examples of this disease, attended by a disposition to contraction or adhesion of the iris, which have been neglected or mismanaged; for, if you see a

case of this description at an early period of its existence, it is presumed you will be enabled to cure it without applying the belladonna to the eye-brow for the purpose of counteracting the injurious operation of any morbid *effects* the disease may have a tendency to produce.

Local applications, such as lotions or fomentations, will rarely be required, inasmuch as the pain, on account of which we recommended their use on a former occasion, is seldom very great. In very protracted cases, particularly where any degree of chronic conjunctivitis or any considerable enlargement of some of the sclerotic vessels existed, you would prescribe, as the concluding part of the treatment, the zinc lotion, the nitrate of silver drops, or the diluted vinum opii; treatment, which is, in the general, adapted to the last stages of those ophthalmic affections which are attended with long continued or very severe inflammation, and which have either left the superficial vessels in an enlarged and atonic state, or have left behind that state of irritability, which patients describe as a "weakness of the eye."

Some persons are frequently troubled with slight attacks of chronic iritis, which, on account of the frequency of their occurrence, impair vision by destroying the translucency of the textures of the eye. The management of such cases will be best conducted by first removing entirely any present attack of inflammation;—secondly, by ascertaining the causes which usually produce them, and providing against their recurrence;—and lastly, by establishing some form of permanent counter-irritation, such, for example, as a seton in the temple or at the back of the neck, or an issue in the arm; and by prohibiting much exercise of the eyes or exposure to any causes which are known to exercise a detrimental influence upon the organ of vision. In these instances we must pay great attention

to prophylactic measures, for there is occasionally a strong disposition to recurrence of chronic inflammation of the iris, and particularly in the various members of some families; I am acquainted with several families, the brothers and sisters of which are blind, or nearly blind, from relapses of chronic iritis:—three brothers and two sisters in one family have lost all useful vision from relapses of this disease, and the eldest of them is not more than fifty years old.

SECTION III.—SYPHILITIC INFLAMMATION OF THE IRIS.

Syphilitic iritis is a disease of somewhat frequent occurrence among the poor, its characters are singularly well-marked, and the treatment of it is so generally successful, and, if judiciously conducted, so obviously successful, that you will feel, I am persuaded, some degree of surprise on learning that two surgeons of such vast experience as HUNTER and PEARSON, (who had made the investigation of venereal diseases a matter of particular study) should have denied its existence; and that until the published opinions of SCHMIDT appeared in 1801, the disease should have entirely escaped the notice of medical men, although we are not justified in doubting that its characters and its occurrence in connexion with the other secondary symptoms of syphilis, existed formerly in as distinct a manner, and recurred with as great, or nearly as great a degree of frequency, as at the present time.

MR. HUNTER, who has been regarded as so great an authority on venereal diseases, says that "there are inflammations of the eyes which are supposed to be venereal; for, after the usual remedies against inflammation have been tried in vain, mercury has been given on the supposition of the case being venereal, and sometimes with

success, which has tended to establish this opinion. But if such cases are venereal, the disease is very different from what it is when attacking other parts, from the constitution, for the disease is more painful than in venereal inflammation proceeding from the constitution; and I have never seen such cases attended with ulceration, as in the mouth, throat, and tongue, which makes me doubt much their being venereal." And Mr. Pearson, in a note addressed to Mr. Briggs, and published in the second edition of his translation of Scarpa's work *On the Diseases of the Eye*, makes the following statement:—"Although I am fully disposed to treat the talents and accuracy of Professor Scarpa with the utmost deference, yet I cannot help entertaining some doubts of the propriety of assigning the gonorrhœa as a cause of ophthalmia; since during a pretty extensive experience of twenty-five years I have never seen one single instance of an inflammation of the eyes which was evidently derived from a gonorrhœa." And again, at the close of the same note, his observations bear more strictly upon the present subject, and clearly prove not only his absolute ignorance of syphilitic iritis, but that the venereal affections of the eye had completely eluded his observation. "The venereal ophthalmia (says Mr. Pearson) resembles in its appearance those diseases of the tarsi and tunica conjunctiva, which are derived from scrofula, and I believe there are no specific characters by which diseases of the eye or eye-lids, produced by the action of venereal virus, can be distinguished from those which are excited from other causes."*

* It is mentioned by Mr. Watson, in a Report of the Edinburgh Eye Infirmary (*Edinburgh Medical and Surgical Journal*, No. 122), that of 268 cases in attendance, "ten examples of acute inflammation of the iris occurred. The whole of them seemed to be connected with venereal disease." This statement embodies a very amusing commen-

When you discover that men, whose means of observation were so great, and whose habits of observation were so rigidly established as were those of HUNTER and PEARSON, failed to remark either the gonorrhœal inflammation of the conjunctiva, or the syphilitic inflammation of the iris, you might almost be tempted to doubt the existence of these affections as occurring either in past or present times. Perhaps MR. LAWRENCE has correctly explained the circumstances which led HUNTER and PEARSON to arrive at such singular conclusions. MR. LAWRENCE remarks that as the treatment of diseases of the eye, was, in a great measure, confined to a distinct class of practitioners, whose study and practice did not enbrace diseases generally, the affection of the eye which in the case of gonorrhœal ophthalmia occurs very seldom, and in the instance of syphilitic iritis takes place usually after the primitive disease is cured, would either not fall under their notice at all, or so very seldom as to be considered an independent, and, as relates to the venereal malady itself, a contingent affection—that no relationship, as respects cause and effect, existed between the original venereal affection, and the inflammatory state of the eye. At least, these are the inferences I deduce from MR. LAWRENCE'S remarks, and they are perfectly consistent with my own views of the subject. MR. HUNTER was disposed to deny the occurrence of syphilitic inflammations of the eye, because the diseases of that organ presumed to be syphilitic were

tary on the opinions of HUNTER and PEARSON. Syphilitic iritis has occurred under my own observation in the proportion of about one to three cases of the other varieties of iritic inflammation. The practice of several of my professional friends has furnished pretty much the same result, so that I am led to regret that MR. WATSON has omitted to state the *probable* circumstances which have determined the irides of his patients at Edinburgh to reject every variety of inflammation but the syphilitic.

more painful than the venereal disease in other parts, and because they were not attended with ulceration, as occurs when syphilitic disease exists in other parts, (the structure of which parts the iris does not, however, resemble;) such, for instance, as the mouth and throat. It will be remembered, that certain parts—certain tissues—are particularly liable to the occurrence of disease as an effect of the previous existence of a venereal sore, such are, the mucous, the cutaneous, and the fibrous textures. The proper iritic structure is very peculiar, though it is generally presumed to be muscular; but muscular parts in general are not obnoxious to venereal disease, and I apprehend that future anatomists will never identify the true iritic texture with common muscular fibre, so that it would appear that the iris is affected with syphilitic inflammation in consequence of the peculiarity of its texture—that I presume to be its predisposing cause—and that it is not its serous texture but its true iritic structure, which is the seat of this particular inflammation, at its commencement.

There are several very important questions connected with syphilitic iritis to which I must direct attention, in addition to a mere description of its local characters and its treatment.

It has been stated, that besides a true syphilitic iritis there is a disease which very closely resembles it, and which, from the circumstance of its occasional occurrence when mercury has been used or during the use of mercury for the cure of chancre, ought to be called *pseudo-syphilitic*, as being compounded, as regards its cause, of two states of the system, termed, the mercurial and the syphilitic. Mr. Travers states that, "although the iritis is frequently met with where no mercury has been taken, it is scarcely ever seen as a sequela of syphilis, where mercury has been exhibited so as to affect the system; and,

I think, it is more frequent as a consequent upon the use of mercury, than occurring as an idiopathic disease." Mr. Hewson, who has devoted so much attention to the venereal diseases of the eye, says that the iritis consequent on syphilis is rarely observed, except where mercury has been inefficiently and inadequately administered.

I am convinced that, as a general rule, iritis occurs much more frequently after chancre, which has been treated either without mercury, or by very small doses of it, than where the contrary practice has been resorted to—that is, where mercury has been freely and adequately administered, and I am convinced also, that in such instances, the inflammation of the iris is most severe; and these convictions are the result of the careful observations of many, very many cases, which have fallen under my own care in the course of my practice, or which have fallen under the care of my professional friends, who have communicated to me the details of them. If you will refer to the cases of syphilis, treated by Mr. Rose and Dr. John Thomson, without mercury, you will find that iritis is mentioned among the secondary symptoms which sometimes occurred, and in several instances with which I have become acquainted, where women have contracted the venereal disease from their husbands, and have, from ignorance of the existence of a venereal sore or from unwillingness to explain the nature of their illness to their medical attendant, taken no medicine for its cure, severe inflammation of the iris and other secondary symptoms of syphilis have followed. A case is related in a recent volume of the *Medico-Chirurgical Review*, where iritis occurred in a nurse from syphilitic ulceration around the nipple, produced by suckling a child whose mother had the venereal disease prior to its birth, and this nurse was proved to have taken no mercury for the sore around the

nipple; and a similar instance—a like instance in every essential particular—has fallen under my own observation.

From a careful review of all the cases which have fallen under my observation, it appears to me that iritis occurs much more frequently after a venereal sore has been healed without mercury, than when this medicine has been employed for its cure; and also that it occurs with the greatest severity as well as the greatest frequency, as one of the secondary symptoms of syphilis, when the original disease—the chancre—has been allowed to heal without the administration of hydrargyrus. It is said that inflammation of the iris may occur, as a consequence of those anomalous ulcerations about the genitals which are presumed to arise independently of venereal infection, just in the same way as pure syphilitic iritis results from genuine chancre. This may be the case, I am not prepared to disprove the opinion, but I certainly do not believe it to be correct.

Symptoms.—Having stated at some length in my former remarks the distinguishing symptoms of iritis, I shall not enter very minutely upon that subject on the present occasion.

The early local symptoms of syphilitic iritis are—1, an arrangement of dusky-brown vessels around the cornea, which is at first by no means perfect and distinct;—2, a slight degree of contraction of the pupil;—3, some pain in the eye-ball or within or around the orbit;—4, increased lachrymation and intolerance of light. The iris is not, however, at this stage, much altered, its polish may be slightly but not materially impaired; the aqueous humor and the cornea are perhaps somewhat less clear and transparent than during a state of health. These symptoms are succeeded by the following phenomena, which gradu-

ally merge into what may be termed, the indications of the full development of the disease. The dusky-brown—cinnamon-brown—vessels, are arranged around the cornea as a perfect and distinct circle, but they do not generally pass upon the cornea, for they dip deeply into the sclerotica, a little anterior to the corneo-sclerotic junction, forming a white line around the circumference of the cornea, and consequently rendering the outline of that part of the vascular zone situated towards the cornea, clear and definite, whilst the opposite side—that towards the periphery of the globe—is shaded off so gradually that it merges as it were into the general state of the vascular system of the sclerotica. At the same time the vessels of the conjunctiva and the sclerotica are more or less enlarged, and the colour of the superficial vessels is less bright, less vividly scarlet than usual—for even the conjunctival vessels participate in this peculiarity in the colour of the deeper-seated vessels in syphilitic iritis, that is, in possessing a dull cinnamon-brown colour; so that, on examining such an eye, it will always present a peculiarly brown appearance. The vessels of the conjunctiva as well as those of the sclerotica will not always be enlarged to the same extent—there may be present a more or less considerable degree of superficial inflammation.

2.—The brilliancy of the iris will now be much diminished, and, as the disease progresses, it will be remarked that with the total loss of its *polish* it becomes changed in *colour*, at first at its lesser circle and afterwards at its ciliary margin. Its pupillary border becomes reddish or reddish-brown, (such is the general tendency of the disease) and the same change occurs in the progress of the malady at its ciliary border. Lymph also becomes effused, sometimes upon its surface, sometimes into the

chambers of the eye, but not in laminæ or thin patches as in the former variety of iritis, but in distinct globular masses of a reddish or reddish-brown colour.*

These red, reddish-brown, and occasionally yellowish-brown masses of lymph, which are so characteristic of the syphilitic variety of iritis, most frequently take place either at or towards its pupillary border, and very rarely indeed towards its ciliary margin, and if attentively examined it is found that they are deposited in two very different forms. The first form or variety, is that in which the reddish-brown lymph is deposited, in a globular form, upon the surface of the iris, or at the edge of its pupillary margin, resembling, in many instances, a drop of fluid matter suspended from the point to which it is attached; and this circumstance might lead us to imagine that it was not actually lymph, but some more fluid secretion, produced by some change in the action of the vessels of the part different from what usually occurs, when, under common inflammation, they secrete the pale laminated lymph so often noticed during an attack of simple acute iritis; but with the exception of its softer and less dense structure, by which it is more nearly approached to the fluidity of pus, and its redder colour which is somewhat allied to that of its blood-vessels, I do not know that it possesses any qualities sufficiently peculiar to justify us in giving it a name different from that usually bestowed

* Various unsuccessful attempts have been made to delineate the characters of syphilitic iritis, (and especially to represent the figure, situation, &c. of the globular depositions of lymph, which so generally occur,) by Demours, (*Traité des Maladies des Yeux.* Planche 37.) Saunders, (*A Treatise on some practical points, &c.* Plate 1.) Hewson, (*Observations on the History and Treatment of the Ophthalmia, &c.* Fig. 5—6;) and also by Weller, (Monteath's Translation of his *Manual.* Plate 4.) Mr. Wardrop has omitted, perhaps from forgetfulness, to represent the appearances of the syphilitic form of iritis.

upon this product of inflammation of the iris—that is, coagulating lymph. But, I repeat, that its consistence is intermediate between that of ordinary lymph and pus.*

The other variety is that in which the lymphatic deposition is situated in the substance of the iris and beneath its serous covering. The deposition so situated will sometimes acquire a large size before its serous covering is ruptured, for, like the other membranes of that class, the serous membrane of the iris does not readily accept the ulcerative process, and only ruptures in the instance before us when the quantity of lymph beneath, excessively distends it. It is on this account that this variety of lymphatic deposition is less globular than the former, and generally acquires a large size, resembling, in form, a small split pea, placed upon the surface of the iris with its convex aspect towards the cornea. It is to the tuberculated appearance so produced (for many of these lymphatic depositions may exist at the same time upon various parts of the iris) to which BEER thus alludes:—"On the pupillary or on the ciliary margin of the iris, or on both, there are formed reddish-brown, knotty-elevations, which

* The depositions of lymph have by no means always a globular form. I have a patient before me whilst writing this note, in whose eye a quantity of lymph is deposited at the pupillary margin of the iris, nearly all around it, so that the pupil is much, though irregularly, contracted. It appears as though a portion of lymph were placed beneath the serous covering of the iris along the whole of its pupillary edge, and that that membrane yielded irregularly, so that the lymph, which is of a convex figure externally and towards the pupil, projects more considerably towards the pupillary aperture at some points than at others. It is exactly as though a number of small lymphatic depositions of various sizes had begun to aggregate. I had yesterday an opportunity of examining an eye affected with syphilitic iritis, in which the globular masses of lymph appeared to be yellow in the centre and at the summit, and red or rather reddish-brown towards their base, somewhat resembling, in point of colour, the appearance of a minute suppurated point, in an ordinary abscess, surrounded by its usual inflamed base.

become larger and larger, and appear, on close examination with a glass, very similar in structure to those *condylomata*, which are called *cristæ galli*." In point of fact, they are merely depositions of a somewhat soft and reddish-brown lymph, situated beneath, or upon, the serous membrane of the iris, and not condylomata, (at least in the ordinary acceptation of that term) to which BEER refers in the passage I have selected from his work.

The globular or convex masses of lymph may be readily seen when deposited on the anterior surface of the iris, but when they take place upon its posterior aspect their existence in many instances can only be inferred. In such cases, it will be remarked that the iris is first projected forward at some point in a convex form, and in some few cases, its fibres will give way, and the true source of the tumour, covered apparently by the iris, (which appeared to be pushed forward by some firm substance of a convex figure, situated in the posterior chamber) is rendered evident.

I find that the same opinion is expressed by DR. MONTEATH, who observes that lymphatic depositions may occur in syphilitic inflammation of the iris, upon its posterior aspect, pushing the iris forwards and occasionally forcing a passage between its fibres into the anterior chamber.

It will be borne in mind that there are two varieties of these lymphatic depositions, which are distinguished according as they may take place *upon* the serous covering of the iris or *beneath* it, and they may occur in various situations, but are more generally found at or towards the pupillary border of the iris, and more rarely towards its ciliary margin; that they are more or less numerous—there may be one or many of them; that their form is generally globular, or hemispherical; and that their size varies

from that of a pin's head to that of a split pea; and that, in addition to these lymphatic depositions, the colour of the iris becomes changed, its pupillary border first acquiring a reddish tinge, afterwards its ciliary margin, and eventually its entire surface. However, with regard to these globules or tubercles, and also the colour of the iris, I may mention that this reddish or cinnamon-brown colour is not always precisely characteristic of their shade, for they sometimes acquire a brighter red tint, and in other cases they will assume a yellowish hue.* The iris, will, of course, when naturally blue or light coloured, become greenish under an attack of inflammation, the tint, however, will be duller and less distinct when the discoloration proceeds from syphilitic inflammation; for, although it essentially depends upon the presence of an increased quantity of blood in the part, on the effusion of minute portions of lymph between its fibres or upon its surface, yet the lymph effused under such circumstances has almost always a red or reddish-brown colour, and the vessels of the iris, the conjunctiva and the sclerotica, possess the same tinge. The globules or masses of lymph will be the same whatever may be the colour of the iris upon which they are deposited; and we must not lose sight of this fact, inasmuch as the existence of these reddish-brown tubercles of lymph constitutes one of the most decisive indications of the syphilitic character of the disease.

I have seen a blue iris rendered of a dusky-red colour

* Dr. Salomon has stated that the globular depositions of reddish lymph which occur in syphilitic iritis, and which are termed by Beer, *condylomata*, vary in colour in consequence of their varying degrees of organization. This remark can have at best but a very limited extent of application, for they assume a reddish colour at their first appearance, before the organizing process can have been adequately established.

by syphilitic inflammation, and it will be at once conceded that if a *large quantity* of the cinnamon-brown lymph were deposited among the fibres or upon the surface of a blue iris, it would give its own colour in a diminished degree, to that membrane. So that, in estimating the change wrought in the colour of the iris by syphilitic inflammation, we must take into consideration the quantity, the colour, and the situation of the deposited lymph.

3.—The pupil, as I have stated, is not *at first* very materially affected, it is slightly contracted and rather less active than usual, and its pupillary border preserves its sharp, thin, definite edge, and its true circular form; but, in the *progress* of the disease, important changes in the pupil occur. In the first place, it becomes more and more contracted, it is rendered irregular and uneven, festooned as it were, being drawn in at one or more points just as though a fine hair had been slightly pressed against its loose border, so as to render the distance between its pupillary and ciliary borders less considerable at these depressed points—these indented points—than in other situations where no such appearance exists. Secondly, it becomes drawn from its natural situation, a little upwards and inwards, and this change of situation will be found to take place after any acute paroxysm or period of severe pain; and on this account such a change may be particularly observed in a morning, after the patient has sustained his usual degree of nocturnal agony. Thirdly, the border of the pupil will become thickened, puckered, and inverted; the pupillary margin of the iris will either be *actually* or *apparently* thicker than usual; will be puckered as though its fibres had acquired some irregular adhesions to each other or to surrounding parts; and its edge will be turned towards the anterior capsule, thus favouring at this stage the

occurrence of *synechia posterior*. I have said that the pupillary border of the iris is, under such circumstances, either actually or apparently thickened, and as the iris is usually at the same time changed in colour to a greater or lesser extent, it may be supposed to be actually thickened by the deposition of lymph into its texture, which deposition, by gluing the fibres of the iris irregularly to each other, may, in addition to that undue irritability which in such a state of things they may be presumed to possess, present an explanation of that puckered appearance we so generally notice. Fourthly, the pupillary border of the iris may have acquired some morbid adhesions to surrounding parts—for instance, to the cornea, or to the anterior capsule. The iris will in the latter stages of the disease approach the cornea, it will be situated nearer to the cornea than it ought to be; and this circumstance has been supposed to depend on the propulsion of that membrane from secretion behind it, but whether it be so occasioned, or whether its undue proximity to the cornea be owing to any actually increased thickness of its substance, I can scarcely determine, that is, as respects the greater frequency of the one or other of these circumstances; I know however, that increased thickness of its substance, change in its figure, and increase in the fluid contents of the eye-ball, are all of them competent to urge the iris forwards, so as to diminish the space between the neural surface of the cornea and the corneal surface of the iris. In those instances where the iris is bulged towards the cornea at one or more points (so as to be nearly in contact with that membrane) from lymphatic deposition—the peculiar hemispherical depositions of lymph situated at its *neural* surface—the cause of this circumstance is sufficiently obvious, but I have been referring, in my previous remarks, to that external

convexity, that bulging of the whole iris towards the cornea, which often occurs in the progress of syphilitic iritis, before any morbid adhesions have taken place.

To complete my observations on these inflammatory depositions into the anterior chamber:—Cases are recorded in which in well-marked syphilitic iritis, onyx and hypopium have formed, and Mr. Hewson distinctly mentions that the deposited matter has been so little adherent to the bottom of the anterior chamber, and at the same time so fluid, that it has most evidently moved its situation with the changed position of the patient, and might be distinctly noticed at one side of the eye after the patient has been lying down for some time upon that side, and resumed its position at the bottom of the anterior chamber on the patient's reacquiring the erect posture. This is by no means usual in this nor indeed in any variety of iritis, except when it occurs in connexion with an ulcerated surface with which the aqueous humor is in contact. Onyx is of course a still more infrequent occurrence. Sometimes blood—mere blood—or a red deposition resembling the fibrine of blood, is effused alone, or it may be effused in conjunction with lymph.

4.—The lachrymal secretion is not much increased, nor is the intolerance of light very great in these cases until the disease has extended to deep-seated parts, or unless it has particularly involved the sclerotica. I should not enumerate, in the general, among the symptoms of syphilitic iritis unassociated with an inflammatory state of the sclerotica, the cornea, the choroid, or the retina, extreme intolerance of light or profuse lachrymation. But the attendant pain is often very severe and uniform in the period of its recurrence. As regards the eye itself it is a darting, throbbing sensation situated deep within the globe; there is a severe pain in and around the orbit,

above the eye-brow, in the nose and cheek, with intense agony at the fore and back part of the head; and this pain, in some one or more of these situations, but more generally above the eye-brow, occurs towards evening, continues during the greater part of the night, and subsides as morning approaches; so that a patient with this disease is comparatively easy during the day, and distressed with the extremest agony the whole, or a greater part of the night. The nocturnal pain and comparative freedom from uneasiness during the day is a pretty uniform occurrence, but the reverse of this takes place in a few exceedingly rare instances.

5.—The cornea and the aqueous humor will become cloudy, much more cloudy than in idiopathic iritis. This cloudy state of the cornea and of the aqueous humor, depends in a great measure in nearly every instance on the extension of inflammatory action to the membrane of the aqueous humor, which is very prone to participate in all forms of constitutional inflammation of the iris. When the deposition of lymph has proceeded so far as to rupture the serous covering of the iris, the aqueous humor is in contact with, and gradually dissolves and washes away the deposition, and in such cases it may be seen partly floating in that fluid, partly lying at the bottom of the anterior chamber, its more dense and tenacious part still remaining in the cist, until removed by the process of absorption, or concealed by the contraction of the cist. These then are the causes of the turbid state of the aqueous humor, and the cloudy state of the cornea; namely, inflammation of the cornea and of the membrane of the aqueous humor, and the solution of the opaque deposition situated upon the texture of the iris, or the residence of such deposition in the aqueous humor in the form of minute and solid fragments, which may be seen

floating in that fluid. I have never noticed the lardaceous ulcers of the cornea, sclerotica and eye-lids, which are, in the opinion of Beer and Schmidt, the not infrequent concomitants of syphilitic iritis.

The inflammation may extend, the choroid and retina may become involved, and then there will be, in addition to the symptoms of iritis merely, the particular symptoms connected with the inflammation of those parts to which the inflammatory action may have extended; and it is a question of some interest, whether, under such circumstances, the inflammation be at all modified by the syphilitic imbuements of the constitution, and whether the vessels of the parts to which the inflammation may have extended, take on that precise action and induce those products, which occur in the syphilitic inflammation of the iris. I have witnessed several cases of syphilitic iritis, in which, from extension of morbid action, the globe of the eye has eventually collapsed, but I have not certainly and distinctly traced any modification in the inflammatory action of the posterior tunics when so excited, different from that which usually occurs when they have become inflamed from the extension of inflammation from the same part under an *ordinary* attack of inflammation, except that the eye-ball has not collapsed so great an extent—it has not become so very small as it is often known to do in the true and perfect suppuration of the globe; and whatever may have been effused within it, it has neither been discharged by a natural process, nor has it led to so much irritation as to render its discharge by artificial means necessary. Mr. Hewson has noticed this ocurrence, and I shall quote his remarks respecting it, because it is an extremely interesting point to ascertain, whether, when the syphilitic inflammation of the iris induces a general

inflammation of the deep-seated parts of the eye, the inflammation so induced is *common* or *peculiar;* or, in other words, whether or not the inflamed iris transmits to them precisely the same kind of morbid action—the same character of diseased action—with which it is itself impressed. Mr. Hewson says "after the disease (syphilitic inflammation) has for some time established itself in the eye, and where an irregular and inefficient treatment has been pursued, an abscess sometimes forms in the deeper-seated parts, which generally terminates in the destruction of the organ. The first symptoms which indicated a tendency to this (as happened in a few cases that fell under my observation) are some degree of swelling and œdema on the fore part, and on one side of the eye-ball, immediately behind the ciliary attachment of the iris. At this place a distinct tumour soon forms, which in a few days becomes pointed, and white and soft at its apex; when opened, the matter it contains oozes but slowly from the orifice, and will be found darker in colour, and more thick and tenacious in consistence, than common pus."*

Mr. Lawrence appears to think that, as the syphilitic inflammation of the iris is always of the adhesive kind (for he has never observed it to terminate in the effusion of pus) when the inflammation extends to the deeper-seated textures, the inflammation is there also of the adhesive character, and he mentions a case in point, where a lady had inflammation of the deep-seated tunics from the extension of the inflammatory action which originally constituted syphilitic iritis, which terminated by producing a bulging of the sclerotica as

* *Observations on the History and Treatment of the Ophthalmia accompanying the secondary forms of lues venerea.* London, 1834. Page 19.

though that part had been extended by the effusion of pus within the globe; Mr. Lawrence opened it at its most prominent part, but without being able to discharge the thick tenacious substance (which was supposed prior to the operation to have been pus) of which this projection mainly consisted. Having made no such attempt myself, I cannot pretend to give any positive opinion upon the subject, but I am certainly inclined to believe with Mr. Lawrence, that it is lymph, and not pus, which is produced by the inflammation of the deeper-seated tunics, when they have become inflamed, in consequence of the previous existence of syphilitic inflammation of the iris. However, the question is simply this—when the posterior tunics of the eye become inflamed as an extension from, or in consequence of, syphilitic iritis, is the inflammation so excited, when prolonged and severe, characterized by the secretion of pus or lymph? The question is not, I repeat, positively determined; it seems probable that it may be sometimes pus, but more generally lymph, which is secreted under such circumstances.

General and constitutional symptoms.—I believe I have now explained all the local symptoms of syphilitic inflammation of the iris, and I have purposely blended this explanation with the discussion of some other points collaterally connected with them. The general symptoms are so various, that I can only mention that in different instances there will be a variable degree of feverishness, head-ache, disturbance of the alimentary canal, and the usual indications of constitutional derangement when suffering from any painful local disease requiring the use of remedies which have a tendency to irritate and disturb the general health, and also requiring the adoption of those depleting measures and that strict abstinence, which it is usually deemed advisable to prescribe for the cure of syphilitic iritis.

Effects of syphilitic iritis.—1.—Syphilitic iritis may lead to the extension of inflammatory action, and will then be characterized by those symptoms which inflammation of the parts to which it may have so extended, usually produces, and may terminate either in lymphatic deposition or purulent effusion, as I imagine, but this point is, as we have just stated, hitherto undetermined.

2.—Various changes may occur in the iris; it may be merely permanently discoloured either at its ciliary or more commonly at its pupillary border or throughout its entire extent, or only at some point or part of its substance where the inflammation may have been most severe; for, of course, it is not always uniformly and equally great at every part of the circle of the iris. And it may sometimes be remarked that in the situation of some large lymphatic deposition which has been covered by the serous membrane of the iris, and which has eventually given way, that a peculiar mark or indentation remains, which I think we may term a cicatrix of the serous membrane of the iris. This serous mumbrane may be also permanently thickened.

3.—It may lead to a change in the situation of the pupil, which is most commonly drawn somewhat upwards and towards the nose.

4.—It may produce some morbid adhesion of the iris, either by its surface or merely by its pupillary border, to surrounding parts;—to the cornea, by its whole or by part of its surface, or by its pupillary border in one or more points;—and to the anterior capsule, by its entire extent, or by a part of its surface, or by its pupillary border at one or more points.

5.—It may change the circularity of the pupil; and may render it angular, oval, oblong, in short, changing its circular shape into almost every variety of figure, and diminishing its magnitude in various degrees.

6.—By producing opaque deposition either upon the anterior capsule or within the pupil, it may permanently destroy vision; or it may impair or destroy vision either by inducing some change in the posterior tunics, or in the transparency of the cornea; or by closing the pupil not by filling it with lymph, but by that gradual and perfect cohesion of every part of its pupillary border which constitutes the true *atresia iridis completa.*

Causes.—The causes of syphilitic iritis have been sometimes divided into the predisposing and exciting: for instance, the previous existence of chancre may produce a predisposition to iritis, but as inflammation of the iris does not generally follow the existence of a venereal sore, although it does so follow on some occasions, it has been termed the predisposing cause, whilst exposure to cold and wet, to circumstances deranging the health, depressing the spirits or impairing the digestive function, the excessive or improper use of the eye, and so on, are known sometimes to excite the disease at once in persons predisposed to it from the circumstance of being, or having recently been, affected with chancre. The present or recent existence of a venereal ulcer is then a necessary preliminary event to the occurrence of true syphilitic iritis, and is sometimes sufficient, as appears from the absence of any other detectable cause, to produce it, while, in other instances, it takes place so immediately on the application of, or exposure to, some of the causes just mentioned, that they are, for the most part, justifiably termed its exciting causes. I have already stated that the use of mercury cannot be properly said to constitute one of its causes, because, when administered for diseases not venereal, such for example, as rheumatism, and pericarditis, it is never known to produce inflammation of the iris. If the administration of mercury did, *per se*, possess the

power of producing iritis, why should it fail to appear when that medicine has been given to remove various forms of acute inflammation, and only occur when prescribed for the cure of syphilis ?*

Diagnosis.—The prominent circumstances which distinguish syphilitic inflammation of the iris from its other forms, are, the globular depositions of reddish-brown lymph upon the surface of the iris, and the hemispherical depositions of the same description of lymph beneath its serous investment; the severe nocturnal exacerbations of pain; the cinnamon-brown appearance of the vessels around the margin of the cornea; the displacement of the pupil upwards and inwards—towards the nose; the peculiar irregularity—sometimes a sort of hour-glass irregularity—of the pupil; the peculiar puckered appearance of the iris, which takes place at an early stage of the disease; the previous occurrence of syphilis, and the existence of primary, or of some other secondary syphilitic affection, in addition to the inflammation of the iris. We must, however, judge by the presence of the majority of these diagnostic symptoms, and not expect that they will all of them be present on every occasion.

Prognosis.—The prognosis would be favourable if we had an opportunity of treating the disease at, or soon after, its onset, before it had extended to the deeper-seated

* I am satisfied that when large quantities of mercury are administered—administered so as to produce and maintain, for a certain period, profuse ptyalism—for the cure of a venereal sore, a state of health is sometimes produced, which leads to, or more readily permits the occurrence of, various events, usually termed *secondary symptoms*; and I am also convinced that such symptoms would not have been at all likely to have appeared, as distinct results either from the existence of the sore alone, or from the administration of mercury for the cure of other disease. I apprehend neither of these opinions are at variance with those I have expressed in the *text*.

tunics, and before it had produced much contraction of the pupil or change in the colour of the iris, before it had led to any extensive effusion of lymph, or any adhesion of the iris to surrounding parts. The prognosis would be unfavourable in proportion as the disease had been long in its duration, had extended to the posterior tunics, had changed the colour of the iris, had produced adhesion of that membrane to surrounding parts, or had induced great contraction of the pupil, or any very considerable deposition of lymph into the chambers of the eye. The state of the patient's health would also furnish another guide to accurate prognosis.

Other inquiries connected with syphilitic iritis.—Before proceeding to discuss the treatment of syphilitic iritis, there are a few points connected with its history which it is right to mention, and which have been hitherto omitted in order to prevent that interruption to the description of its local and its general symptoms, which their introduction would have caused.

In the first place it may be inquired, if syphilitic iritis is associated with any particular description of chancre, and with that only; and what are the characters of that kind of chancre which is most commonly observed to be succeeded by the variety of inflammation of the iris which we have termed *syphilitic?* Secondly, what form of eruption, as constituting a part of the secondary symptoms of syphilis, usually accompanies venereal inflammation of the iris?

With regard to the first of these questions, I am unable to furnish any satisfactory information from any *extensive experience* derived from my own practice, for although I have witnessed an immense number of cases of syphilitic inflammation of the iris, I have generally seen the inflamed eye after the chancre which caused it, has healed,

and have consequently been compelled to rely, in a great measure, on the patient's description of the characters of the original sore for any information I have been able to obtain upon this point; for, as may be supposed, the marks or cicatrices left by such sores do not present any characters sufficiently decided and distinct to enable us to determine with a due degree of precision respecting those of the sore of which they are the vestiges. However, I have seen some instances where the secondary symptoms have occurred prior to the cure of the primary sore, and in such cases the appearance of the sore has varied; in some few of them it has accurately corresponded to the generally admitted characters of what is termed the true Hunterian chancre; in others, it has presented more the appearance of a simple abrasion of the skin; and in two instances its characters were mixed, being neither so indurated at its base, nor so deeply excavated as the former, nor so superficial and clean as the latter, which I have represented as resembling a simple abrasion. Mr. Lawrence had three cases of chancre under his care at the same time, and he remarks, that in each instance the sore resembled a mere excoriation of the surface attended with slight thickening and induration of the cellular membrane, and that in all these cases iritis occurred accompanied with *scaly* eruptions.* However, this question must still be considered as undecided, and it will be understood that, as far as experience has hitherto developed facts bearing upon this point, syphilitic iritis follows chancres of various kinds, and that

* Mr. Rose concludes from a long and valuable series of cases that, "most of the papular eruptions followed chancres which were not very deep, and which healed without much difficulty. Several of them had a thickened, but not a particularly indurated margin." This statement corresponds with the experience of Mr. Carmichael.

it does not occur with greater frequency relatively to the comparative frequency of occurrence of the various forms of chancre, after any one of them.

The second question relates to the kind of eruption most usually consequent on chancre, and on this subject, I may mention, as the result of experience, that the copper-coloured papular* variety is that most frequent of occurrence; secondly, the scaly eruption; thirdly, the pustular; fourthly, the vesicular; and lastly, the tubercular. This is the exact order of their occurrence as relates to its frequency, in a series of seventy-one cases, which I have witnessed and noted in my *case-book*, and I believe this statement is consistent with the experience of others, whose means of observation have been much less limited than mine. Mr. Lawrence has not entered upon this inquiry, but merely mentions that inflammation of the iris may be combined with *any* of the four kinds of eruption I have just mentioned; Mr. Carmichael represents it as being almost invariably connected with the *papular* variety of eruption; Mr. Hewson says it is more generally associated with the *papular* and *scaly* varieties; whilst Mr. Mackenzie's experience has induced him to assert that he has found syphilitic iritis most frequently associated with the *pustular* and *scaly* forms of eruption.

Independently of eruptions, syphilitic iritis is sometimes coexistent with other secondary syphilitic symptoms, such as ulceration of the throat, pains in the limbs, inflammation of, and deposition upon or beneath, the periosteum.

A child may be infected by its parent and may be the

* These papulæ are sometimes attended with so slight a degree of induration and redness of the skin, that they very nearly resemble slight maculæ or stains of that texture.

subject of syphilitic disease accompanied by its various secondary symptoms, such as, cutaneous eruptions, iritis, &c.; such cases unquestionably occur although very rarely.

The constitution may be imbued with the syphilitic poison in various ways; for instance, a surgeon may incautiously inoculate himself, either by touching a chancre in the manual examination of his patient, or by attending a woman in labour who is suffering from chancre; it may happen, and has happened, that under both these circumstances, a surgeon having a small sore upon the hand or wrist, has, after being so exposed, suffered from a syphilitic sore and its usual secondary symptoms. Mr. Lawrence relates that a gentleman who had a small sore upon his finger, became affected with syphilis from touching the genitals of a girl of dissolute character; and, I am now acquainted with a surgeon who is recovering from a most severe and disastrous attack of secondary symptoms, in consequence of neglecting a venereal sore in the forefinger, which he contracted by attending a diseased female in her accouchement.

Treatment.—Bleeding.—Some surgeons, as I have before mentioned, consider that syphilitic iritis may be cured without the administration of mercury, and rely in a great measure on antiphlogistic remedies for this purpose, and, in the course of my observations, I have admitted this fact to the following extent, namely, that antiphlogistic remedies alone were sometimes adequate to the cure of syphilitic iritis, and that I had myself cured such cases by means of this description; but, as the practice is hazardous, as it will not always, nor, I believe, generally *cure*, and as a trial of it in those cases where it is inadequate to effect this object, places the patient's vision in extreme danger by permitting the progress of the disease, and as other treatment to be presently recommended is so uni-

formly successful when sufficiently early adopted, as it controls and arrests the inflammation so speedily and certainly, and removes its effects so completely, I must again repeat my decided conviction of its great superiority. The question is not whether antiphlogistic remedies, are adequate, in any case, to remove the inflammation, but whether, all circumstances considered, they constitute the most eligible mode of treatment hitherto discovered.

In all cases where syphilitic iritis is severe, (whether accompanied or not by an affection of the posterior tunics) and takes place in strong plethoric subjects, I should advise you to commence the treatment by the abstraction of blood from the arm or by cupping; in this way you will at once reduce the inflammatory action, and place the patient in the most favorable condition for the operation and influence of the subsequent part of the treatment; and I have at the same time judged it prudent to act upon the bowels by means of an ample dose of calomel and jalap; not relying on this measure as specially important for the purpose of lowering the inflammation, but as a means of unloading the bowels, and thus enabling us to continue, without interruption, the after part of the treatment. These are the two first measures to be adopted in the treatment of syphilitic iritis—the one as a means of lowering the power of the circulation, and the other as a mode of preparing the patient to bear without interruption the administration of a due quantity of mercury.

Mercury.—The measures already mentioned lower the inflammatory action, lessen the pain, and place the constitution in a favorable state for the reception of the mercurial influence, but they are generally inadequate to effect those changes in the capillary circulation which are essentially necessary to prevent the occurrence of those

depositions, the capillary vessels are employed in producing. The morbid process which is now existing and progressing does not depend so much on the general strength and vigour of the system, for they have been reduced by the measures previously adopted, as on the peculiar and imperfectly understood operation of the capillary system, which requires some stimulus to change its action and alter its condition, or at least the influence of some agent capable of effecting these objects, in whatever way that influence may operate. This stimulus or this influence is afforded by mercury; the change it effects in this system of vessels is beautifully exemplified in the indications of its operation afforded by the suspension of deposition, the absorption of effusions which have already occurred, and the returning brilliancy of the iris—all of which may be observed to occur under the influence of its operation. Besides, we must not forget the "constitutional origin" of this "local disease," we must not forget that it arises from a syphilitic taint in the constitution, which, independently of the inflammation of the iris, is amended by the administration of mercury.

There are persons who cannot bear the administration of mercury, and I shall presently describe a valuable substitute for it in all such instances; and again I may remark that whether iritis occurs whilst the system is under the influence of mercury for the cure of chancre, or whether one eye becomes affected as the other is recovering, the use of mercury is equally required and promises to afford equal benefit.

You may administer mercury in the form of pill—consisting of two or three grains of calomel combined with a quarter, a third, or the half of a grain of opium—every one, two, four, or six hours, according to the particular circumstances of the patient, and especially according to

the urgency of the symptoms and the progress of the disease; for, in some instances, where lymphatic deposition has taken place in large quantity, where the iris is much contracted and adhesions appear to have formed, or are about to form, the only chance of saving the organ depends on the speed with which we are able to impress the system with the mercurial influence. In such cases, therefore, it is most desirable to lose no time in rendering its influence manifest; we should, in fact, administer the calomel and opium every hour, or hour and half, and, if necessary, recommend mercurial frictions also.

But you may be called to a case some time after it has arisen, adhesions may have formed, the pupil may have become contracted, and may be more or less completely blocked up with lymphatic deposition; would you, then, make no efforts to improve this wretched condition of things? Remembering what has been stated respecting the continuance of deposition from the inflamed iris, when they have been once excited to such morbid action, and that under such circumstances a very slight, and somewhat insidious form of inflammation, may still be *continuing*, and, at the same time, *organizing* the deposition; remembering also the great sorbefacient powers of mercury and its capacity to secure the removal of feebly vitalized structures, you would not hesitate, in very recent cases of this description, to give the patient every chance of benefit resulting from the operation of mercury; and, I may observe, that until accustomed to witness the manifestation of its powers in such cases, you will be astonished at the changes it effects.

But there is a limit to its influence, and where the effects of iritis have continued for a very long time, it would scarcely be justifiable to subject the patient to a mercurial course, (such as would be required to give him

any chance of advantage) with the very slight prospect of benefit which would then exist.

There are some persons in whom mercury even in small doses excites diarrhœa, so that you cannot obtain, in them, its specific effects by the usual mode of administering it. Such persons will perhaps be able to bear a quantity of the mercurial ointment mixed with opium rubbed into the thighs or upon the inner side of the arms, two or three times a day, and in this way you may very safely affect their constitution.

Turpentine.—Mr. Hugh Carmichael of Dublin, has recommended the administration of turpentine in syphilitic inflammation of the iris, and has most ably advocated its efficacy, and pointed out, with great precision, those cases in, and those circumstances under, which it is likely to be peculiarly serviceable. He does not recommend it to the exclusion of mercury—he does not advise it with a view of superseding the use of hydrargyrus—but, in certain habits of body, and under particular circumstances where the administration of mercury in adequate doses is rendered inadmissible, he has found it to be a very efficacious and an excellent substitute for the more generally employed remedy.

I have tried it in several instances in the form and quantity recommended by Mr. Carmichael, that is, in drachm doses, three times a day, made into an emulsion, and I am prepared to add my feeble testimony in its favour.

Counter-irritation.—Perhaps there is no form of inflammation of the eye in which the employment of counter-irritation is less useful than the present, and although I am not prepared to say with Mr. Hewson, that bloodletting and blisters afford no relief in this variety of iritis, yet, it is perfectly true that bleeding and counter-irritation are less necessary in this form of iritis than in any other,

and that blisters ought never to be employed at an early stage of the disease, nor applied very near to the diseased organ. A blister to the back of the neck, or to the highest point of the forehead, will sometimes relieve that disposition to chronic disease which is occasionally present on the subsidence of the more acute symptoms.

Collyria and fomentations are not generally required, but where the pain is particularly severe, we may sometimes afford relief by prescribing a poppy fomentation, an aqueous solution of opium, or the diluted vinum opii, or some similar narcotic application.

Belladonna.—It is advisable to apply the belladonna to the eye-brow as a means of relieving pain, but more particularly for the purpose of checking the tendency to contraction of the pupil, and of enlarging that aperture by gradually detaching it from recently formed adhesions, when such adhesions have taken place. You would smear the extract of belladonna, weakened by the addition of an equal part of the unguentum cetacei, thickly upon and above the eye-brow every evening, for that is the time when the pain is most severe and when the pupil chiefly evinces a tendency to contract. I do not know that any additional advantage would be derived from applying it more frequently than once in the twenty-four hours.

Some medical men think it better not to use the belladonna during the *existence* of the *acute symptoms;* they believe it to possess an injurious influence upon the inflamed iris, and to be unattended by any advantage when applied at this period. I am satisfied, however, that it has no prejudicial effect upon the iris, and that it is generally good and safe practice to apply it during the whole of the treatment, in order to render the prevention of contraction of the pupil as certain as our remedial

measures will permit; and besides, it sometimes supersedes the necessity of rubbing upon the eye-brow the mercurial ointment mixed with opium, which the German writers so strongly recommend, and which may be repeated at short intervals three or four times if the severe character of the pain renders it necessary. If, in despite of these measures, a certain degree of contraction of the pupil should occur and the iris should acquire morbid adhesions, the application of the belladonna should be continued for several weeks afterwards, until, indeed, the adhesions are destroyed or much elongated and the pupil is restored to its natural dimensions. We need not be afraid of injuring or paralyzing the iris by the persevering employment of this narcotic application; many patients have to my knowledge used the belladonna drops daily, or every other day, for two or three years, during the formation of cataract, without, as the result of the case has shown, experiencing any such mischievous effects.

I should have stated that persons suffering from iritis should have their apartment darkened, and should wear a common green shade before the eyes. Their diet should also be lowered, you would, of course, prohibit meat, wine, ale, porter, spirits, fruit, and acids, and green vegetables in particular, on account of their tendency to irritate the bowels during the use of mercury. The diet I usually recommend is limited to broth, soup, light egg pudding, tea and coffee; but cases will occur where we are compelled to direct some particular articles of food, as the patient's sole diet, and to permit spirits and water to be administered pretty liberally. Mercury produces in some persons so much depression, so extreme a sense of exhaustion, that we are compelled to sustain the sinking powers of the system during its administration, with

brandy and water or some other stimulant, and by such means only can we continue to employ this medicine in a quantity sufficiently ample to subdue the inflammation of the iris.

SECTION IV.—ARTHRITIC INFLAMMATION OF THE IRIS.

The class of diseases to which I am now directing attention (iritis) was not known until the time of SCHMIDT's publication in 1801, much less distinguished, as it now is, into several varieties, each of which is characterized by its own proper symptoms, and requires for its cure a description of treatment different in many respects from that of the other varieties of inflammation of the iris. It will be perceived that if I were to attempt to comprehend all the symptoms belonging to these several varieties of iritis—to arrange them as belonging to one disease under one name—I should furnish a most confused and inconsistent catalogue of morbid phenomena which would possess, in a few respects only, some analogy to each of the kinds of iritis, but would in truth be neither strictly applicable to, nor descriptive of, any one of them.

Gouty inflammation of the iris occurs, as its name implies, in persons who are constitutionally predisposed to gout; it may arise and exist in connexion with gout in some other part of the body, but this is not usual; or it may alternate with gouty inflammation in some other situation; or, it may take place from its own proper exciting cause in persons who are occasionally affected with gout, or who are, in the ordinary acceptation of the term, members of a gouty family.

Symptoms.—The early symptoms of gouty iritis are very mild, and often insufficient to decide the character

of the disease, unless taken in connexion with the constitutional condition and history of the patient. There is generally a slight, creeping, tingling, uneasy sensation about the cheek and eye-lids, the eye itself is somewhat vascular and intolerant of light, the pupil slightly contracted, and the lachrymal secretion increased; but, in the progress of the disease, these symptoms are aggravated and others not at first existing are superadded to them.

Redness.—The vascularity of the sclerotica is, at this stage, somewhat increased, there is a distinct enlargement of some of its vessels, a slight zonular arrangement around the cornea which terminates abruptly a little anterior to its edge, leaving, between its termination and the corneal margin, a whitish-blue line of sclerotica; the vessels do not pass upon the cornea, but terminate, quite distinctly and definitely, a little anterior to it. Such is generally the case, but this whitish-blue line which so often intervenes between the corneal aspect of the vascular zone, and the precise corneal margin, is absent or very indistinctly observed when the cornea or sclerotica are at the same time much inflamed. The appearance of these vessels is somewhat peculiar; they are of a deep livid colour, they might in some instances almost be termed purple, and the sclerotica becomes of a dingy grayish colour. You will remark, too, that some of these vessels become very large, so large that you would be inclined to call them varicose; and this is one of the features of the disease which should never be lost sight of, inasmuch as whilst it tends to distinguish the disease, it, at the same time, indicates that laxity—that diminution of tonicity—which points out, or at least affords some information respecting, its mode of treatment. This state of the vessels has been particularly alluded to by SCHMIDT, who represents the extension of the disease to the posterior textures, as leading to, and

being characterized by, the same circumstance, that is, varicosity of the vessels. In the progress of the disease, when the choroid coat is implicated, the vessels of the choroid become much distended, and may produce partial absorption of the sclerotica, and appear, as bluish elevations, through that attenuated texture. This appearance *may* be so produced, but it rarely occurs, as I think, from this cause solely, for, as I have before explained, it is more generally referable to the action of inflammation upon some particular part of the texture of the sclerotica itself, by which it becomes, first, competent to resist the pressure from within; and secondly, those changes take place which are too apt to be attributed to the pressure of the varicose vessels of the choroid.

Pain.—Intolerance of light.—Lachrymation.—At first the pain is known merely as a creeping, tingling, uneasy sensation about the cheek and lids, but afterwards it is changed into an acute burning pain, or, to use the words of Beer, a "racking pain," not only in the eye and orbit, but in the whole of the affected side of the head, and of the cheek also; and, upon inquiry, you will generally find that the supra-orbitary suffering so well marked in some of the other varieties of iritis is present also in this, and that to an extreme degree. Now, this pain is not always uniform, it is not always equally severe, it is frequently aggravated towards midnight, or it has periods of exacerbation and remission; but I do not much insist upon this circumstance, for many cases occur in which the period of remission of suffering is so exceedingly short, and the degree of remission so extremely slight, that the patient may be said to be the subject of constant torture.

The intolerance of light is very considerable, it is much greater than the apparent increase of vascularity would induce us to expect, and, on this account, combined with

the fact, that the vitreous humor frequently becomes changed in colour after attacks of this description, so that the patient is ever afterwards affected with glaucoma, I am inclined to believe that the posterior tunics (the choroid, the retina, and the hyaloid membrane) are not unfrequently affected in connexion with the iris, in this variety of iritic inflammation.

The lachrymal secretion is much increased, and this, indeed, almost always takes place in conjunction with photophobia, and partly, I believe, from the forcible and spasmodic action of the orbicular muscles of the lids; however, there is a peculiar appearance in the instance before us, which is not remarked in simply increased lachrymation. The fluid discharged has a white frothy appearance, and consists of minute globules of watery fluid. The white foaming appearance is undoubtedly owing to the impulsion it receives during its exit from beneath the lids, by the spasmodic contraction of the lids themselves. This fluid cannot be confounded with the meibomian secretion, which is also frequently secreted in larger quantity than is usual at the same time; it is more abundant, less consistent, and much less tenacious; it has a watery and a frothy appearance, and is quite unlike the morbid meibomian secretion sometimes witnessed in arthritic iritis, which is a densely white, and a very consistent and tenacious substance.

Changes in the colour of the iris, and in the size, form, and situation of the pupil.—The changes wrought in the colour of the iris, by inflammation, are always modified and decided by that it possesses in a state of health, although, in accordance with a general tinge of the whole of the external textures and of the blood-vessels, there is an inclination to preserve the same morbid tinge. We have seen that the effect of inflammation, even in that

form of inflammation in which the predisposition to preserve a particular colour is most strongly evinced, as in the syphilitic inflammation of the iris, that the continuance of severe inflammation only tinges the iris of a reddish or reddish-brown colour, when that membrane is naturally of a dark colour; it does not, for instance, render the blue iris brown, unless, indeed, by the aid of sanguineous effusion or of the enlargement of vessels, or unless a layer of red lymph be deposited upon its surface or, in preponderating quantity, among the iritic fibres. In the progress of the disease the iris appears, to adopt the language of MACKENZIE, soft, and as if it had undergone a degree of maceration. I have not remarked the occurrence of abscess of the iris, nor have I frequently noticed hypopium, nor much dulness either of the cornea or of the membrane of the aqueous humor, unless the disease has proceeded so far, or recurred so frequently, that very many of the textures of the eye have become implicated, and some of them completely disorganized.

With regard to the state of the pupil, I have generally remarked that it has been contracted, and in addition to this, it may be mentioned that, in some instances, its form becomes altered, so that it is rendered oblong in the lateral direction; but adhesions of various kinds will modify its figure, so as to cause it to assume every variety of form—but I have mentioned the change in the pupil which most frequently occurs. It is not drawn from its situation, as in the syphilitic form of iritis, but generally retains its central position, unless dragged from it by obviously existing morbid adhesions. The effusion of lymph upon the anterior capsule sometimes takes place in large quantity, so as to destroy vision entirely, and I have seen one or two examples in which the pupil has been more or less completely filled with calcareous de-

position—a deposition resembling that which results from gouty inflammation in other situations. The former occurrence, that is, the deposition of lymph upon the anterior capsule, sometimes takes place to so great an extent, as to give rise to great torment, and I have been compelled to make an incision of the cornea and remove it with a forceps, for the purpose of relieving that intense degree of suffering its presence may have produced. But the iris may be merely fringed with a small quantity of lymph, or it may have acquired frenular adhesions to the capsule; or a web or thin film may exist in the site of the pupil adhering on all sides of the pupillary border.

Repeated attacks of arthritic iritis (and many persons are subject to relapses of gouty inflammation of the eye) have an evident tendency to produce the following effects:—1, to change the colour of the iris;—2, to alter the figure of the pupil;—3, to produce glaucoma;—4, to contract the pupil in a variable degree, or to cause those lymphatic depositions within it or upon the anterior capsule, which always impair, and frequently destroy, vision; and to these effects must be added, those disorganizing changes in the deeper-seated textures of the eye, and that bulging of the sclerotica to which I have already adverted.

Constitutional symptoms.—As regards those constitutional symptoms which the existence of a painful local affection may excite, it is not necessary for me to do more than direct attention to the mere fact of their occurrence, because you are already well acquainted with them, but there are other symptoms which generally accompany, and sometimes precede, the establishment of disease in the eye, I mean, that disordered state of the health, or an attack of dyspepsia which frequently acts as the exciting cause of gout in other situations. The precursory symp-

toms of gout, just as they occur when about to fix upon other parts, always precede an attack of gouty inflammation of the eye, unless indeed gout be actually present in some other situation when the arthritic inflammation takes place in the eye.

Causes.—The causes of arthritic iritis may be properly divided into the predisposing and exciting; the former consisting in what may be termed the gouty diathesis; the latter are many and various: such as, inducing an attack of dyspepsia by intemperance; exposure to a moist atmosphere without proper clothing or active exercise; the retrocession of gouty inflammation in some other part; traumatic ophthalmia or a severe blow upon the eye—may also be classed among the exciting causes of gouty iritis. The latter circumstance so frequently constitutes its cause, that I am desirous of stating that in very many instances where a gouty individual meets with a blow or some accidentally applied violence to the eye producing at first merely a simple attack of conjunctivitis, that inflammation will often degenerate into iritis, and will be marked by all the characters of true arthritic inflammation of the iris, and will so speedily succeed to the infliction of the injury, that we cannot misapprehend the cause of its origin. To this class of the exciting causes of gouty iritis must be referred, the operation for cataract, whether by extraction, reclination, or depression; and it is always right, before undertaking an operation of this description, to ascertain the state of the patient's constitution, in reference to this arthritic tendency.

Prognosis.—In almost every primitive attack of arthritic iritis, the prognosis will be favourable, but when any one attack has been preceded by many others in a constitution thoroughly gouty, and in an individual addicted to habits of free living and intemperance, the prognosis would be

less favourable, for, changes in the colour of the iris, and in the form and transparency of parts, will frequently be present. However, persons may have many relapses of arthritic iritis without experiencing, as a *necessary* consequence, any *material* impairment of vision.

The iris appears to be the only texture of the eye which is particularly prone to arthritic inflammation, and here I refer to the true structure of the iris and not to its serous covering; for, if the membrane of the aqueous humor were obnoxious to this inflammation as a primary disease, it would of course occur in various parts of it, as, for instance, in its corneal or capsular portions; but as I do not find that this takes place, I have been led to the conclusion that there is something either in the structure or function of the iris, or of both combined, in consequence of which its proper texture is more particularly prone to arthritic inflammation than its serous covering, or indeed any other texture of the eye. We observe that particular textures in other situations are especially obnoxious to particular forms of disease, and the same rule obtains with regard to those of the eye.

Treatment.—The necessity for active antiphlogistic measures will depend on the existing symptoms, and on the strength and vigour of the patient's constitution. If there be much excitement, a full and strong pulse, with great local pain, you may venture to bleed with freedom—with that degree of freedom which a full knowledge of the constitutional peculiarities of gouty persons would regulate; it will be borne in mind that active depletion and the liberal administration of mercury are not often necesssary in this form of iritis, on the contrary, as a general rule, such means are inadmissible. Under these restrictions, and with these qualifications, you would bleed locally or generally as circumstances may require, and evacuate the

bowels pretty freely, by means of some properly adapted purgative medicine. When the tongue is very foul, the appetite defective, and the breath fœtid, an occasional emetic may be serviceable, but they are not to be frequently repeated for very obvious reasons. Where the pain is severe, whether seated in the eye-brow, the cheek, the nose, or the eye-ball, you will derive great advantage from a combination of calomel and Dover's powder (two grains of calomel and eight of the compound powder of ipecacuanha) administered night and morning. When the pain is somewhat intermittent, and the system thoroughly gouty, and the patient not excessively enfeebled, you may prescribe the vinum colchici with the usual precautions. In some cases you will find the carbonate of iron serviceable, particularly where there is severe frontal pain and hemicrania; and undoubtedly you may administer, with perfect propriety, the sulphate of quina when the patient is feeble and the constitution broken and impaired.

Counter-irritation is also extremely beneficial, and should be maintained in some active form throughout the duration of the disease. However, supra-orbitary pain, when accompanying arthritic iritis, is best relieved by the infriction of mercurial ointment blended with opium, as was formerly recommended for the relief of the suffering associated with simple acute and syphilitic iritis.

Belladonna may be applied to the eye in those cases where the pupil is much contracted, and is still contracting, or where the iris has recently acquired, or is acquiring, morbid adhesions to surrounding parts.

Collyria and fomentations may be useful in some of these cases, and, as they are merely intended to relieve pain, I think the warm anodyne fomentations most advisable; any of those in general use, usually answer this purpose very well.

No needless exposure of the eye to light or to a cold damp atmosphere should be permitted, and the patient's diet should always be regulated; mindful, however, of the general quality and character of his diet, you would not altogether deprive him of his stimulating beverage, if he has been long accustomed to indulge in its use pretty freely, but content yourself with moderating its quantity, and changing, if necessary, its quality, and at the same time it would be proper to prohibit all articles of diet of an indigestible nature. These precautions are really very necessary. In some instances you might deem it proper to enjoin an abstinent diet, but where there is not much inflammatory action present, in an aged person who had been long accustomed to a free mode of living, and who had also been affected in a similar way on many former occasions, you might even recommend a more liberal diet than that they are in the habit of taking.

I cannot too urgently recommend you not to forget the adoption of prophylactic measures, as soon as you have removed any particular attack of gouty inflammation of the iris, where any tendency to relapse is evinced.

I shall not say any thing of rheumatic iritis, of which some writers have treated at great length, for I have never seen it take place as a primitive disease. Undoubtedly, rheumatic inflammation of the sclerotica sometimes extends from that membrane to the iris, and in such cases the inflammation which has so extended acquires some modification; it is not exactly correspondent with simple idiopathic iritis, but this occurrence is by no means a frequent one, and does not require any treatment different from the disease of the sclerotica, of which it is an extension, except that the same measures should be more energetically employed. For, you will remember, that among the remedies for the cure of rheumatic sclerotitis,

bleeding, calomel, and Dover's powder, and colchicum, were particularly mentioned. In short, the iris is not prone to accept rheumatic inflammation—it wants that aptitude derived from structure which is necessary to fix the site of disease—and it rarely, and as regards my own experience, it never becomes so affected as a primitive disease, and when it participates in that of the sclerotica, (which, however, very seldom occurs) it requires for its cure merely the more active and energetic employment of those remedial measures, which are, in their more moderate employment, adapted and adequate to the cure of the primary disease.

As regards that *stated* combination of morbid action which is sometimes mentioned—as though the constitution would readily permit the integrity of the characters of disease to be destroyed, and the purity of its type blended and confused by adventitious alliances, and a belief in which opinions would lead us to imagine that there frequently exists such affections as the mercurio-syphilitic iritis, or arthritico-rheumatic iritis, and so on—I have only to remark, that such combination of disease, detectable by a correct adherence to any particular type or set of symptoms, does not occur with a frequency which renders it necessary to treat of them in detail as distinct and separate maladies.*

* There sometimes exists a slight form of inflammation of the iris which continues for a long time, and frequently recurs if the subject of it get disordered in his health, or be much exposed to the risk of taking cold, or if the surface of the eye in particular be much exposed to the influence of cold. It is characterized by a slight dulness or cloudiness of the iris, and by a partial and interrupted zone of bright red vessels around the cornea. This zone is interrupted, at least it is very distinct and intensely vivid at some parts of the circle, and scarcely perceptible at others. The subjects of the disease suffer from slight intolerance of light, and increased lachrymation, and pain in and around the orbit and the cheek. The pain is generally most severe during the night, and the disease almost always occurs in elderly

SECTION V.—STRUMOUS INFLAMMATION OF THE IRIS.

Strumous iritis is an affection so distinctly characterized, that I am rather surprised to find that it is not in any way referred to by several excellent modern writers on ophthalmic disease. It is not mentioned by SCHMIDT, WELLER, SAUNDERS, or TRAVERS, and MR. LAWRENCE merely mentions the *occasional existence* of strumous iritis, and dismisses its consideration in a very few words, and in the following whimsical and inexact language. "In strumous children, inflammation commencing in the external parts of the eye, sometimes extends to the iris; this strumous iritis is usually attended by some change in the structure of the cornea. The opaque state of the cornea prevents you from observing the changes taking place in the iris, so that the very *existence* of the iritis, is often not known until it has gone through its course and *come to an end.* The treatment is the same as for strumous ophthalmia generally."

The extreme difficulty with which we are enabled to obtain a perfect view of the eyes of children suffering from various forms of strumous ophthalmia, is the only circumstance by means of which I can explain the omission of all notice of strumous iritis among the varieties of the inflammatory affections of the iris, for some time after the diseases of that texture were known to be so important in their effects and had attracted so much attention and been investigated with so much care and industry.

persons of a weak and broken-down constitution. It is always relieved by the use of warm anodyne or vegetable fomentations to the eye; by the application of counter-irritation to the temples; and by the administration of either the carbonate of iron, or the sulphate of quina, with a powder taken at bed time, consisting of one or two grains of calomel with five or ten of Dover's powder.

When examining the eyes of scrofulous children it will be found that there is little to be seen, by an ordinary attempt at separating the lids, except a portion of the lower part of the cornea and the globe; the whole of the cornea, with this exception, will be concealed beneath the upper lid, and so forcibly will the muscles of the eye act in producing this elevation of the cornea, that the utmost ingenuity of a practised examiner will often be necessary to obtain a distinct view of the entire cornea. Under such circumstances it is not always an easy matter to detect the precise nature of a disease which has so many points of resemblance to two other affections; namely, inflammation of the cornea, and inflammation of the membrane of the aqueous humor. Again, the substance of the iris—the true iritic texture—is more frequently affected in conjunction with, or in consequence of, the inflammation of one or both of these membranes, than separately; indeed, so great is the tendency to inflammation of the membrane of the aqueous humor and the cornea in strumous children, that in many instances where true primary iritis has been distinctly marked from its commencement to its establishment, the two textures to which I have just adverted then participate in the inflammatory disease, and these various textures are afterwards conjointly affected—there is present, in fact, inflammation of the cornea, of the membrane of the aqueous humor, and of the iris. Admitting then that the true strumous iritis rarely exists alone for any great length of time; that it sometimes occurs in consequence of the extension of inflammatory action from the cornea or the membrane of the aqueous humor, and in other instances gives rise to their inflammation, I say, admitting this *frequent* connexion of diseased action, we must also allow that in other cases it exists quite alone, and totally independent of any morbid process either in the

lining membrane of the chambers of the eye, or, in the cornea. Like the other forms of strumous inflammation, it occurs chiefly in children, very rarely in infancy, and never in extremely old age.

Strumous iritis takes place most commonly in what BEER terms *the second class of scrofulous subjects*—the lively and irritable; sometimes in *the first class*, or those who are dull and torpid in their appearance and in their physical energies; and also, though more rarely, in those who do not bear about them the most emphatic characters of scrofula, who have a few only of the indications of that state of constitution, and those not very clearly developed. With regard to its symptoms I may mention them very briefly, for they do not in many respects differ from those of strumous inflammation of the membrane of the aqueous humor, except in their greater intensity, a greater impairment of the free movements of the iris, and the greater degree of intolerantia lucis with which it is attended.

Redness.—The redness is more or less considerable, but not so great as in any other form of iritis, with the exception of the arthritic. The vessels are of a pink colour, and are zonularly arranged around the cornea, often extending to, or creeping upon, its margin. This zone is not equally distinct throughout its entire circumference, for, as the iris may be more inflamed at one point than another, the lesser or greater perfection and distinctness of this zone will indicate the respective amount of inflammation of its various parts, and pretty accurately denote the nature and extent of its *partiality*. Sometimes the conjunctival covering of the cornea will be inflamed at the same time, and, in such case, its surface will be vascular in a greater or lesser degree; in other instances, the inflammation of the lamellar texture may be indicated by the existence of red vessels which pass

more deeply between its layers, or of an aggregation of them, producing a spot or patch of redness upon the cornea. The conjunctiva and sclerotica also participate, but in a variable, and usually very slight, degree; for, it will be remarked, that strumous diseases of the eye are not generally characterized by much vascularity.

State of the iris and pupil.—I need scarcely observe that the colour of the iris sometimes becomes changed when the inflammation has been long continued; but it will often happen that the disease may have been of some duration, and the iris shall have merely lost its polish and brilliancy. The iris does not readily experience those changes in its texture, and that decided alteration of colour, which it evidently and speedily undergoes during the existence of syphilitic or acute idiopathic inflammation. It may continue for some time, and may frequently relapse without leaving behind that permanent change in the colour of the iris, which the existence of the syphilitic or the acute idiopathic iritis for the same period, would most certainly produce. Loss of its polish is the first change, but it may also, by the progress of the disease, by its severity, by its duration, and by the frequency of its recurrence, become altered in its colour, that alteration being in precise conformity with the rule previously explained in reference to its natural colour; and thirdly, its pupillary border may be rendered irregular, and it may acquire adhesions of a varied extent to various parts. These changes are in no respect peculiar, they do not differ from those occurring under similar circumstances in idiopathic iritis.

Condition of the cornea.—The cornea and membrane of the aqueous humor are sometimes conjointly affected, and, in such instances, there may be so much cloudiness of the one or other of these membranes, or the aqueous humor

itself may be rendered so turbid, that we cannot accurately ascertain the changes occurring in the iris, and, it is, as I presume, to such instances that Mr. Lawrence refers, when he says that the opaque state of the cornea prevents a surgeon from ascertaining the existence of iritis "until it has come to an end." This dull, semi-opaque and dirty-bluish appearance of the cornea, is by no means a necessary concomitant of strumous iritis, although it very frequently indeed accompanies it, in a greater or lesser degree.

Pain.—Increased lachrymation.—Intolerance of light.—The pain in strumous iritis is not usually severe, but, like the pain attendant on strumous disease in other parts, it is generally very mild. It is, like the intolerance of light, most considerable in the morning and at mid-day, becoming less as the brilliancy of the light becomes diminished. The intolerance of light is, indeed, one of the most prominent characters of strumous inflammation of the eye, but it is most severe in those cases where the conjunctiva and sclerotica are chiefly affected; strumous conjunctivitis and strumous sclerotitis are associated with a much greater degree of photophobia, than strumous inflammation of the iris, and of the cornea. In those cases where scrofulous iritis has been preceded by sclerotic and conjunctival inflammation, it will be found that it is attended with more photophobia than in other instances where no such disease previously existed; and, we shall then have an opportunity of observing the increased strength of the corrugator and orbicular muscles, and the peculiar distortion of the countenance, produced by the patient's frequent and active efforts to exclude the light.

The lachrymal secretion is also very abundant, but it is scarcely that scalding lachrymation which attends strumous conjunctivitis or strumous sclerotitis; it is equally

abundant, but less hot, and does not irritate the parts upon which it flows as the scalding tears do, in the strumous forms of conjunctival and sclerotic inflammation; but I am not sure that this is owing to the milder and less irritating quality of the tears themselves, for, on considering all the circumstances of the case, there may be detected many reasons, independently of any difference of quality in the lachrymal secretion, why that secretion should irritate the skin of a patient suffering from strumous inflammation of the conjunctiva or sclerotica, and should be perfectly innocuous to the surface over which it flows, in strumous iritis.

Although I have mentioned that strumous iritis may lead to the same changes in the iris, and to the same lymphatic deposition as the acute idiopathic form of iritis, yet, it produces these changes less frequently, and only after the inflammation has existed for a long period or has frequently relapsed. It is not often productive of hypopium, nor does it frequently lead to the formation of abscess of the iris.

Constitutional symptoms.—Whatever may be the state of the patient's constitution (not merely as respects scrofula, for I am presupposing it to be scrofulous) prior to an attack of iritis, or whatever disorder of the stomach and bowels may previously exist, that disorder is aggravated by the existence of the local disease, but mainly, I conceive, in consequence of the pain with which it is attended, and the restlessness and irritability it excites. Independently of these circumstances and the presence of the general evidences of struma, there are no constitutional symptoms sufficiently striking and important, and, at the same time, uniform in their occurrence, to require specific notice.

Causes.—I can only explain the occurrence of primary

strumous iritis by referring to that local aptitude to receive any particular morbid impression, which, in some parts and in some constitutions, is known to exist. The usual and hackneyed enumeration of the immediately exciting causes of scrofulous iritis, is little else than a disingenuous cloak for ignorance.

Effects of strumous iritis.—Like the former variety of the disease, strumous iritis may lead to an extension of inflammatory action and its consequences;—to change in the colour of the iris;—to contraction and closure of the pupil;—adhesion of the iris to surrounding parts;—to staphyloma, &c.

Treatment.—As a general rule, bleeding and the administration of mercury, are less applicable to strumous diseases of the eye than to any other class of ophthalmic inflammation; but the disease I am now investigating is one, which, under peculiar circumstances, is only successfully treated by the adoption of such measures. In primitive strumous iritis—primary inflammation of the proper iritic texture—occurring in a moderately strong child, it would be advisable to apply six or eight leeches once or twice at the onset of the attack, to the lower lid, and having cleared the bowels by means of a little properly adapted purgative medicine, to administer night and morning, a grain of calomel with two or three of antimony; and this plan of treatment would be still more necessary if the colour of the iris had become changed, lymph effused, and the pupil materially contracted. But having given this remedy a fair trial, having given it to the production of ptyalism without any visible amendment of the disease, would it be prudent to continue its use? Would it be advisable to consider this evidence of the inefficacy of the remedy insufficient? I apprehend not, for if, under such circumstances, we are tempted to persevere, under a

vague impression that calomel is a proper remedy for the cure of iritis, the patient's constitution may, and very probably will, be seriously injured, and his vision greatly impaired; but if, on the contrary, we prescribe the quinine in adequate doses, it will almost invariably be found, that the inflammation at once subsides, and the patient's health is re-established. I speak from repeated observation of the fact, and only reiterate opinions I have published many years ago, and may extend the remark by stating that in many cases the disease may not be very severe, and the patient may be feeble and emaciated, and that in all such instances, or a very great majority of them, the administration of the sulphate of quina will be succeeded by the happiest effects. These, then, are precisely the circumstances in which the administration of the sulphate of quina is calculated to produce so much advantage—first, where, although the case may *appear* to call for bleeding and mercury, and may have been so treated unsuccessfully; and secondly, where the case is accompanied by symptoms of feebleness and emaciation from the first, or where they may have supervened either on the continuance of the disease, or upon the adoption of mercurial or other enfeebling treatment. I can recommend this medicine most strongly, not to the absolute exclusion of other tonics, such as the mineral acids, vegetable bitters, liquor potassæ, &c., but as answering the purpose of an excellent tonic, and, at the same time, of possessing what the other remedies do not so fully possess—namely, a property of curing the disease of the eye, and strengthening and invigorating the constitution at the same time. The quina may be prescribed in mixture with the infusion of roses, to which an additional quantity of acid may be added, or it may be taken in the form of a pill, if objected to in a liquid form. The quantity

will vary according to the age of the patient, from half a grain to two grains, taken three times in the twenty-four hours.

I am desirous to draw attention to certain distinctions between simple and scrofulous iritis, which appear to me to render the administration of quina so especially applicable to a certain stage of the latter variety of the disease. It will be remembered that I referred to a particular change in the *colour* of the iris as occurring very rapidly in simple acute iritis, which alteration of colour indicated the existence of that state of the capillary vessels which, if unchanged, will infallibly lead to the destruction or serious impairment of vision. I also stated, that before this change of colour occurred, the iris became dull, it lost its polish. Now the same things take place when the iris is inflamed in scrofulous children; there is first a dulness, a loss of polish, and afterwards an actual *change in the colour* of the iris, but of these two stages of the disease, the first is prolonged in the strumous, and very brief in the simple acute form of iritis; hence there will be perceived an important distinction, as respects the symptoms of these two varieties of inflammation of the iris, which sufficiently explains the capacity of any tonic medicine, to effect, by its influence on the constitution, 'ere the iris has undergone any organic alteration, those changes in the disease, in the strumous affection of the iris, which cannot be effected by their agency alone, when it has continued, as in the simple acute form of iritis, so that the colour of that membrane shall have already experienced an important change.

Iodine is a favourite remedy for scrofula, and it has been strongly recommended for the cure of strumous inflammation of the eye. I have tried it in some of these cases, which were very manageable by the sulphate of

quina, without success, and I am strongly disposed to believe that its actual merits are quite inferior to what might be imagined, if guided solely by the good opinion expressed in its favour, by its panegyrists, and far inferior in these cases to the sulphate of quina.

Local remedies are chiefly useful where there is much spasm of the lids; when this occurs, or whenever the pain in the eye is severe, it may be advisable to use the poppy or some narcotic fomentation, and, in some instances, the patient will derive relief from simply fomenting the eyes with water, as hot as can be conveniently borne. At the latter stages, the irritability this form of disease has a tendency to leave behind, will often be readily removed by the daily use of the vinum opii.

Counter-irritation is also extremely serviceable, and at the commencement of the treatment, and immediately after the employment of depleting measures, if such measures are deemed necessary, blisters may be applied to the back of the neck or behind the ears, and they may either be frequently repeated or a discharging surface may be maintained for some time by the use of savine cerate, or the same object may be much better attained by the formation of an issue in the arm, or a small seton in the temple, or at the back of the neck.

The rules previously laid down, when treating of strumous conjunctivitis, in reference to diet, clothing, air, and exercise, are equally applicable to the present variety of scrofulous disease of the eye, and as those subjects were then canvassed at some length, I need not again enter upon their consideration.

Of course, this description of iritic inflammation may exist in various degrees of intensity—its progress is not always equally rapid, nor its degree equally severe, nor its duration equally prolonged.

SECTION VI.—PROLAPSE OF THE IRIS.

The iris may become prolapsed either by the extension of ulceration through the whole of the corneal lamellæ, by sloughing of the cornea, by the gradual absorption of its texture, as occurs at the summit of staphyloma and conical cornea, or in consequence of a penetrating wound of the cornea.

In the first of these instances the extent of the prolapse will, of course, be modified by the size of the ulcer through which it may protrude. A small circumscribed ulcer of the cornea may lead to the evacuation of the aqueous humor, and the prolapse of a very minute portion of the pupillary border of the iris, which always falls forward, if not morbidly adherent to surrounding parts, when that humor is discharged; but if the ulceration be then arrested, and the local application of belladonna be perseveringly employed, the iris will often be withdrawn from the corneal aperture, that aperture will become filled with new matter, and no evil consequence will result with the exception of an opacity of the cornea, which the destruction of its *entire* layers invariably leaves behind. Such is the most favourable result, which, under these circumstances, can ever take place. However, the ulceration of the cornea may be arrested, but the iris may be so firmly fixed in the ulcerated aperture, that we cannot disengage it, and it will become permanently adherent and eventually induce the following condition of parts:—the iris will become adherent to the ulcer of the cornea, forming partial synechia anterior, the cornea will be more or less nebulous for a variable distance around the ulcer, and around a minute black spot which will ever afterwards indicate the site of the adhesion of the iris to the

cornea. The pupil will, of course, be altered in figure from the partial adhesion of its pupillary border, and, if it be adherent only at one part, it will be rendered cordiform, the apex being the point of adhesion—the part where the iris is adherent to the cornea. I have seen the peculiar appearance to which I have so recently adverted, remain after ulcer of the cornea, which has not penetrated through the whole of its layers, and where no synechia anterior has existed—there has been a small black or brown spot, quite different from the natural appearance of the cornea, which has been surrounded by a white or bluish-white ring or circle of opaque matter. It has happened in several cases which have fallen under my notice, that where the eye has been inflamed and the cornea pretty deeply ulcerated, the inflammation has subsided, the ulceration has healed, and the only remnant of the previous mischief has been a small dark-coloured flattened spot upon the cornea, surrounded by a circle of opaque matter—the disease has been said to be cured, the eye has been, with these exceptions, considered free from disease; but suddenly this dark-coloured flattened part of the cornea has given way, the aqueous humor has been discharged, and the iris has become adherent to the cornea.

Having explained the circumstances which may give rise to the preceding condition of parts, I may briefly mention that the projection of the iris through a minute aperture in the cornea will often give rise to severe pain; not in every case, for the local susceptibility of parts, and the general susceptibility of the system, will chiefly decide either the total absence or the degree of severity of this occurrence. It will be imagined, that the stretching and strangulation of so irritable a texture as the iris, its pressure against the sharp margin of an ulcerated opening in the cornea, and its constant and direct exposure to external

irritation and atmospheric influence, would generally produce great local uneasiness, and such, in fact, is the usual result of this form of injury or disease.

If we allow the prolapsus to follow its own course and do not take measures to remove the protruded portion of the iris, it will be removed, partly by being retracted towards its ciliary attachment, partly by the process of absorption, and partly by sloughing; and this combined process will, in favourable cases, lead to a natural cure just as complete as any that can be accomplished by the aid of the most judiciously conducted treatment. It will be remembered, that the natural sensibility of the iris is peculiar—its structure is peculiarly susceptible to light—but it may be touched, as in the operation for cataract, without exciting any material uneasiness, and without provoking it to contract.

The iris may be so much projected in consequence of an extensive loss of the corneal substance, as to constitute *staphyloma iridis;* or it may be prolapsed at several points, and, in this case, if the cornea is at the same time projected, the disease is then termed *staphyloma racemosum.* In the worst forms of prolapse of the iris, those cases in which it takes place very extensively, either in consequence of the loss of a great part of the corneal substance, or of a large wound of the cornea, the consequence may be, as far as relates to the iris, diminution or obliteration of the pupil—partial or total adhesion of the iris to the cornea—and staphyloma of the iris.

The iris may be prolapsed in consequence of a wound of the sclerotica extending to the margin of the cornea, but such accidents are not rendered serious so much on account of the prolapse of the iris, as on other and more important grounds, such as, inflammation of the choroid and retina, and injury to the ciliary nerves.

Treatment of prolapse of the iris.—When the prolapse of the iris depends on ulceration of the cornea, of course it is highly important to check that disease, which, whether connected with some form of inflammation of the eye in general, or of any of its particular tunics, is producing the extension of ulceration of that part of the cornea through which the prolapsus has occurred, and by means of which it is increasing.

But other measures are necessary; for instance, if the prolapse be very trifling, if the iris merely protrude through a minute aperture in the cornea, it would be right to touch very cautiously, the prolapsed part with a peice of the solid nitrate of silver worked to a very fine point. It is a question how long it is necessary to continue the use of the solid nitrate of silver? When does its use cease to be beneficial? It is not usual to apply the solid nitrate of silver after the prolapsed portion of the iris has been retracted or destroyed to a level with the surrounding part of the cornea; its application then becomes mischievous and painful:—mischievous, because by so doing we are producing inflammation and opacity of the cornea; and painful, inasmuch as its use to the healthy structure of the cornea is necessarily productive of acute uneasiness. Instead of applying the solid nitrate of silver as I have just advised, it is recommended by many surgeons, and also by Dr. Jacob, to touch the prolapsed iris with a fine pencil, the point of which has been moistened so as to take up a little of the powdered nitrate of silver.

But the prolapse may be still more extensive, and in such case I can scarcely advise that the whole of the protruded portion of the iris be touched; it would be far better to drop into the eye about twice a day, a solution of the nitrate of silver, (the strength of which would vary from one to four grains to the ounce of distilled water,) or

rather, to touch the prolapsed part with a fine camel-hair pencil dipped in that solution; and the eye may also be occasionally bathed with the common alum or zinc wash.

Besides these measures, it would be right to apply the extract of belladonna to the forehead; to smear it upon and above the eye-brow in a moderately thick layer, repeating its application every twenty-four hours. And although I cannot say at what precise period after the occurrence of the prolapsus, the local application of belladonna ceases to be useful, and becomes inadequate to withdraw the iris within the chambers of the eye; yet, inasmuch as there remains a tendency to an increase of the prolapse, whilst there is an uncertainty respecting its capacity to induce the retraction of the iris for many days after its first appearance, I should strenuously advise the application of the belladonna, even though we may not be called upon to conduct the treatment of a case of this description for some time after the prolapsus has taken place. In this view of the subject, it will be observed that the local application of belladonna is presumed, first, to arrest the tendency of the iris to further prolapse; secondly, to induce the retraction of that membrane, when protruded, from the pressure of the muscles of the globe, into the corneal opening, and confined in that situation, merely by the stricture upon its substance caused by the sides of that aperture; and thirdly, to detach it from slight and recently formed adhesions, which may also happen to exist.

Now, this treatment, with the exception of the stimulating part of it, is universally adaptive; but where the prolapse is extensive, or where there is present an acute degree of ophthalmia, it would be necessary to be more sparing in the use of stimulants until those acute symptoms had been subdued; employing for their subduction,

of course, the same measures which the same amount of inflammation unconnected with prolapse of the iris, would require. In this way we may expect to arrest and suspend the cause of the prolapse where that particular cause (extension of the corneal ulcer) existed, and, at the same time, diminish or remove the prolapsus itself. Of course, where the pupil becomes closed or nearly so, in consequence of synechia anterior, if there be good reason to believe that the deep-seated parts are not materially involved in the morbid changes—that the retina is not unfitted for the purposes of vision—vision might be improved or restored by the formation of an artificial pupil; but if the pupil be materially diminished in magnitude, and its figure ever so much altered and disturbed, so long as that pupil, small and malformed as it may chance to be, remains clear, and the deep-seated parts retain their integrity, vision may be sufficiently good for all ordinary occasions, and no operation is necessary for the purpose of enlarging the pupil—a very small and irregular pupil is not incompatible with moderately good vision.

In recommending the use of the nitrate of silver drops, I should state that in some cases, when employed for a long time, they have a tendency to discolour the conjunctiva—to render it of an olive colour; and when this has once taken place, the stain to which their prolonged use gives rise, remains ever afterwards. I have seen the conjunctiva so stained many times, but not, in any instance, by merely continuing the use of the silver drops for six weeks or two months, as stated by Dr. Jacob. Where the strong nitrate of silver drops have been regularly used for a year or longer, to remove opacity of the cornea, to prevent the increase of staphyloma, to suppress the growth of pterygium, and so on, I have certainly witnessed the occurrence, and, in such instances, the stain

is particularly deep at the lower lid, at and near that part of the conjunctiva where it is reflected from the inferior palpebræ to the globe. I know a labourer, who, some years ago, had been using the nitrate of silver drops, from a prescription I gave him for the cure of an incipient pterygium, and who afterwards neglected to call upon me, and continued to use the drops until the whole of the conjunctiva had assumed a dark-brown tint. There is certainly a strong tendency in mucous and cutaneous texture, to retain and acquire from divers causes, various shades of colour which they do not naturally possess.

SECTION VII.—STAPHYLOMA OF THE IRIS.

The term *staphyloma iridis* is applied to that condition of disease, in which the iris becomes projected at many points through distinct apertures in the cornea, or in the absence of the whole or a great part of the cornea, is protruded in one large convex mass, the colour of which will correspond with the natural colour of the iris, unless changed by inflammation.

Now, in the former of these varieties, the treatment of the disease is generally limited to the adoption of palliative measures; the resistance offered to the further extension of the prolapse by the intervening portions of the cornea, prevents the iris from forming that large prominence, or those considerable projections, so frequently observed in the second variety of this affection; but if any one or more of these staphylomatous projections should bulge so considerably as to cause any material irritation, it might either be shaved away with the cataract knife or punctured with the fine grooved needle. The palliative treatment

consists in the employment of local stimulants or astringents, such as the solution of the nitrate of silver, the alum or the zinc lotion, with the occasional use of blisters and purgative medicines.

The large staphyloma of the iris which is formed by the propulsion of its entire texture, is a prominently-convex dark-coloured tumour, and is very variable in its size—it is sometimes very large, it may acquire a magnitude much more considerable than any the former variety ever attains. The history of its formation may be very briefly stated:—in the first place, the iris must have undergone some change by which its texture is rendered thicker, the pupil being at the same time almost or quite closed; secondly, the cornea must have been extensively destroyed. If the former change did not take place, the iris would be incompetent to sustain and resist the pressure from behind, and the fluid contents of the globe would also be discharged. These, then, are two essential conditions of the disease, namely, thickening of the iris with great diminution or total obliteration of the pupillary aperture, and destruction of the corneal texture. And it will be remembered, that in addition to the thickened state of the iris, by which it has acquired an increased capacity of resistance, it is supported by surrounding parts—the parts around the base of the projection—and also by deposition upon its surface, and within its texture, after the staphyloma has occurred, just as the cornea becomes thickened up to a certain stage, when it is the seat of staphyloma. There is also another circumstance which materially assists in retarding, and preventing the increase of, the staphyloma of the iris. The anterior chamber is always destroyed, and so is, very generally, the posterior chamber; the former necessarily occurs in consequence of the destruction of the cornea, and the latter event takes place owing to

the contact of the lens (presuming that it is not discharged at an early period of the disease which produced the staphyloma of the iris) with the neural surface of the protruded iris, so that the pressure of the contents of the eye-ball is rendered very much less than it would be, if, in addition to the other causes producing it, there was a free secretion of the aqueous humor. Again, the lens is not generally discharged from the eye, in consequence of the obliteration or permanent diminution of the pupillary aperture produced by the previously existing inflammation, but it is displaced, so that its margin is supported or rests upon that part or circle of the cornea which remains, and thus a great part of that pressure which would otherwise be exerted upon the under surface of the projected iris, is sustained by the neural aspect of the dislocated lens.

The preceding statement will explain the nature of the causes most likely to induce this form of disease. It is most frequently produced by gonorrhœal or acute purulent ophthalmia, and by those maladies extensively impairing or destroying the integrity of the corneal tissue, such as the formation of an abscess within its interlamellar texture, the occurrence of a variolous pustule, ulceration or sloughing of its texture. The treatment is here also either palliative or radical; the former consists in the subduction of any external or internal ophthalmia with which the staphylomatous condition of the iris may be associated; the occasional employment of counter-irritation; tapping the staphyloma, and the application of astringent lotions. The radical method of treatment is frequently adopted, not so much for the relief of the staphylomatous eye, as for the purpose of relieving irritation in the opposite organ; for, it is not productive of much local uneasiness or constitutional disturbance, unless it be unusually large, or

occur in an unhealthy or extremely susceptible individual, and, on this account, I have purposely abstained from entering upon the detail of symptoms which have neither a frequent nor a necessary connexion with this disease of the iris. We remove the staphyloma of the iris, when it becomes necessary to excise it, less frequently because it is the seat of great uneasiness, than because it has rendered the opposite eye weak and irritable.

The radical treatment, then, consists in the removal of the staphylomatous projection, by the same means as those employed for the removal of staphyloma of the cornea; and sometimes a severe attack of pain and inflammation will succeed this operation. I have only performed it twice myself (I refer to staphyloma of the iris, for, of course, I have in numerous instances operated for staphyloma of the cornea) and in both instances severe pain and inflammation succeeded the operation, and in one of them suppuration of the eye-ball eventually took place, and this, too, without any appreciable constitutional defect in the patients themselves. However, it must be admitted, that when this operation is long delayed where a necessity for its performance exists, the patient is permitted to have acquired an irritability of system which is opposed to the successful result of any operation whatever. Reflecting on the nature of the texture we remove and the serious injury we inflict upon the eye by this operation, we can scarcely feel surprised that serious inflammation should so generally follow its performance; when I say generally, I ought to state that this opinion is delivered from a very limited experience as respects my own practice—I speak chiefly in reference to the result of operations at which I have been present, and which have been performed by various professional friends. After an operation for the

removal of staphyloma of the cornea, the patient will sometimes experience so vivid a perception of light, that he is for a moment induced to believe that his vision is not in so helpless a state as has been represented, but, in the instance before us, no such fallacious hope is excited, for the inflammation and disease which has led to the loss of the cornea and to the production of the changes in the texture of the iris, has also destroyed the transparency of the humors and deranged the organization of the deep-seated membranes.

The treatment to be employed after an operation for staphyloma iridis is extremely simple:—Place a small compress upon the lids and secure it by means of a roller passed lightly around the head, and make use of antiphlogistic measures to the requisite extent; and also prescribe cooling lotions, blister the back of the neck, and exclude light from the patient's apartment. As circumstances might indicate, prescribe some anodyne medicine or application, or rely on venesection and other antiphlogistic measures, for the relief of pain. In the progress of the cure the use of some astringent lotion or the nitrate of silver drops may be required, and chiefly so with a view of preventing the formation of a new staphyloma, for it will be remembered, that when we have removed that part of the anterior paries of the eye-ball, which resisted the influence of the pressure of their contents in their propulsion forwards, if the eye-ball do not collapse, the part removed must be supplied, to a certain extent, by new matter, which new matter may be distended at an early period after its deposition, unless measures are employed to counteract that tendency; hence, as I formerly explained, it may be advisable to bring the divided parts together by means of a fine suture, after the

excision of the cornea, for the cure of staphyloma of that texture, but this operative proceeding is not in any instance adapted to staphyloma of the iris.

SECTION VIII.—FUNGOUS EXCRESCENCES FROM THE IRIS.

The iris is liable to fungous growths, sometimes arising independently of any discoverable previous disease, but more generally from inflammation, injury, and prolapse of that membrane. When fungous growths arise from the iris, (which membrane was perfectly healthy prior to their appearance) the diseased growth is distinctly visible at every stage of its existence, and cannot be confounded with any other affection. Several such cases are recorded, and I have seen two instances of this nature.

Red or dark-coloured fungoid growths, possessing no malignant character, and readily cured by excision or repressed by the use of local astringents, often take place after prolapse of the iris, and the rapidity of their growth is very remarkable. I remember a poor woman whose vision became destroyed after an attack of gonorrhœal ophthalmia, in whose right eye there was a very good example of the true extensive staphyloma of the iris, whilst in the left there was a large dark-coloured fungoid projection, arising from a prolapsed portion of the iris. I removed it several times, but it reappeared with singular rapidity, and was eventually repressed and cured by the use of a strong solution of the nitrate of silver.

Now, there is nothing malignant in these diseases, and they are not extremely vascular, and therefore you may snip them away with perfect safety, and afterwards apply the ordinary astringent and stimulant lotions, or they may be removed by the application of caustic, and you may

always cause them to contract or slough by the careful and persevering application of the solid nitrate of silver. It is not necessary to tie them with a fine ligature, as I have known to have been done in more than one instance, for this is an unnecessarily painful and tedious mode of getting rid of a disease which may be speedily and very effectually removed by more agreeable means.

I mentioned that two small fungoid growths arising from the iris, which was in other respects quite healthy and which had not been affected with any previous disease to which these new productions could be fairly attributed, had occurred under my own immediate notice, and both of them were perfectly removed by the influence of mercury administered so as to produce and maintain its specific action for a short time, and, in order to prove that this form of disease is extremely rare, and perhaps even when it exists seldom falls under the medical practitioner's observation (for, in both the instances to which I have just referred, it constituted merely a slight personal blemish rather than a source of pain and inconvenience) I may mention that an experienced surgeon to whom I described the particulars of these cases, thought I had confounded them with lymphatic deposition or some other effect of iritis. A case has been related to me by a medical friend, in which a tumour grew from the iris, was loose and spongy in its texture, and so vascular that, as in the case mentioned by Mr. Wardrop,* it sometimes ruptured and filled the anterior chamber with blood. The patient resided at a distance from Birmingham, and I advised my friend, who wrote to me upon the subject, to try the effect of mercury and afterwards of iodine, and he has since told me, that the disease was cured by the agency of mercury

* *Morbid Anatomy*, Vol. 2, page 53.

given to the production of slight ptyalism. I have seen other cases where growths have appeared to arise from the ciliary ligament.

Such then is the treatment of what may be termed the primary fungoid growth from the iris—a loose spongy growth unconnected with iritis; uncombined with any change in the colour or material alteration in the mobility of the iris and the size and circularity of the pupil; and unassociated with prolapse of that membrane.

I cannot say any thing respecting the cause of this latter variety of the disease; its other forms, those in which the fungus arises in consequence of the prolapse of the iris, are of course remotely dependent on the prolapse itself.

In the course of my observations I have stated that the disease under investigation is not of a malignant nature, but I do not wish to be considered as denying to the iris, a capacity to originate malignant disease—malignant disease has been found by many excellent authorities to be first developed in the iris, but I have not witnessed the occurrence myself. However, it will be understood, that the remarks I have now made do not apply, or refer to, a malignant disease, but to one which is perfectly manageable by treatment; which may arise from the iris when it has protruded externally, or which may proceed from that membrane when it retains its natural situation, either preceded or accompanied by or otherwise certain other diseased changes in the iris; and which has no tendency to contaminate the constitution.*

* There are many cases of fungous excrescence of the iris related by authors, and particularly by Maitre-Jan, Scarpa, Beer, Lawrence, Travers, and Wardrop.

SECTION IX.—ABSCESS OF THE IRIS.

An abscess may form in the iris, either from injury or inflammation of that membrane, or indeed, without any clearly defined cause. I have seen a small abscess form in the iris in consequence of a severe fall upon the head; this abscess has afterwards burst and has left behind no mischievous effects. In the cases to which I am now directing attention, there may be observed a small swelling of the iris, which is covered by its serous membrane, this tumour may gradually subside, or it may increase, burst, and discharge its contents into the anterior or posterior chamber. If it burst into the anterior chamber, its contents fall, as a minute quantity of pus, to its lower part, and constitute a variety of spurious hypopium; the opening in the iris is generally small, it quickly closes, the hypopium is absorbed, and the eye is restored to its healthy state. Such is the most successful termination of the case, but its result may not be so favourable when the abscess of the iris is connected with important disease of other parts of the eye. As to the other circumstances associated with the iris, its mobility, the state of the pupil, and so on, they will, of course, differ in different cases. It will be remembered, then, that an abscess may form in the iris, may discharge its contents into the anterior or posterior chamber, as it may happen to burst on its corneal or neural surface, and that it may exist as the only visible affection, or be connected with more important disease of that membrane. After an abscess of the iris has burst and healed, a minute indentation may be noticed which indicates the former situation of the mischief. The disease (which does not frequently occur) is

for the most part, readily controlled by venesection, and by the administration of mercury.

SECTION X.—INJURIES OF THE IRIS.

Local injury may produce inflammation of the iris, and may eventually excite those changes which we have already described and considered. In other instances, it may lacerate that membrane or detach it from its ciliary connexion. If the detachment of the iris from the ciliary ligament take place only to a very limited extent, it may lead to the formation of an aperture which may be termed a second pupil, and which may greatly confuse vision, and may even give rise to what is familiarly termed, double vision; and in such cases it would be desirable (the confusion of vision may be great enough to justify the measure) on the subsidence of the inflammation immediately consequent on the blow or concussion of the eye-ball, to make these two pupils into one, by dividing the intervening portion of the iris, and this may be accomplished by the iris knife passed either through the sclerotica or through the cornea. But where the substance of the iris is lacerated, the laceration commencing at its pupillary margin, the treatment of the case is, in fact, the treatment of iritis and its consequences. Of course, this form of injury changes the natural figure of the pupil.

Foreign substances may be impelled into the eye and become imbedded in the iris, and may either be absorbed or become encisted. Prior, however, to the occurrence of either of these events, they may produce great irritation and inflammation. I do not think it advisable to remove foreign bodies so situated, in the general, but when the foreign substance is large, is evidently leading to dis-

organization and suppuration of the globe, and is at the same time giving rise to severe pain, their removal becomes quite necessary, and may easily be accomplished by a section of the cornea and the introduction of a forceps beneath the corneal flap. I have formerly pointed out at some length the various circumstances connected with the formation of cists around foreign bodies when in contact with, or imbedded in, the iris, I have described the mode in which they are developed, and the subsequent changes such cists may undergo.

There is yet another effect consequent on the laceration of the iris, from a blow or concussion of the eye—namely, absorption of the iris, which I proceed to consider as a separate disease, and not merely as an effect of that injury, because although *generally* produced, it is not *always* excited, by the laceration of the iris.

SECTION XI.—ABSORPTION OF THE IRIS.

The iris is sometimes partially or totally absorbed either from a blow upon the eye or from concussion of that organ, from laceration of the iris, or from concussion of the body generally, and particularly by a fall upon the head. I do not know that it ever arises from inflammation; it has not followed the decline of the inflammation in any of the many cases of iritis I have witnessed. Of course I am now referring to those cases of iritis which arise independently of external violence, for that has been already mentioned among the causes of absorption of the iris. The partial absorption of the iris which occurs where it has been prolapsed, is not meant to be included in my present observations, for, as I ought to have explained before, that portion of the iris

which is in immediate contact with the ulcerated margin of the cornea through which it has been protruded, becomes absorbed, and its edge only is adherent to the corneal cicatrix.

It will be noticed, that in those cases where the iris becomes absorbed from laceration of its texture, the pupil will gradually become enlarged, irregularly enlarged, for, it will first disappear around the site of the laceration, by degrees it will be reduced to a narrow slip which will remain attached to some part of the ciliary ligament, this portion will also be pretty generally taken away, and then the patient will become completely amaurotic, even if, during the progress of the disease, a certain portion of vision had remained. Such is the common cause of the absorption of the iris, and I have endeavoured to give a correct exposition of the mode in which its disappearance takes place under the influence of that cause.

A blow upon the eye, or a fall upon the head, may, without lacerating the iris, eventually cause the absorption of that membrane, and, under such circumstances, the pupil becomes gradually enlarged, and vision impaired, until the whole or nearly the whole of the iris is removed, when the amaurosis becomes complete.*

Having described the causes of the absorption of the iris; the mode in which that absorption takes place when induced by laceration of its texture; the appearances presented in its progress; and its eventual effects upon vision, I shall briefly direct attention to the appearance of

* When amaurosis follows absorption of the iris which has been caused by a blow upon the eye, or by any accidentally applied violence to the organ of vision, the loss of sight is usually less owing to the removal of one of the most important of the natural defences of the retina, than to the concussion that membrane sustained at the time the injury was inflicted.

the eye when the disease has terminated in the absorption of the whole of the iris. A superficial glance at the eye will generally determine pretty satisfactorily the nature of the disease after we have once seen it, and it has been properly pointed out and explained. The cornea will present a uniformly deep-black appearance, there will be no pupil, for the membrane in which it is formed, no longer exists. If the capsule of the lens (the lens itself is generally absorbed) has become opaque, and the vitreous humor cloudy, the nature of the disease, with these additions, may be equally clearly distinguished, unless the cloudy state of the vitreous humor supervened upon the opacity of the capsule of the lens.

I am not aware of any remedies capable of arresting the undue action of the absorbents of the iris at any stage of that process under the influence of which the iris is absorbed. If there be much inflammation present, that inflammation should be removed by suitable means, and we may generally remove it by their agency, but we cannot arrest the process of absorption, and, as I have previously explained, when that absorption has completed the removal of the iris, we can neither prevent the occurrence of amaurosis nor cure it when it has taken place. It is said that when the iris is absorbed, the patient should wear an instrument having an aperture in its centre, rather smaller than the natural pupil, and so contrived that the light shall only gain admission to the eye through this minute opening. I can only remark that in the many cases I have witnessed where the iris has been extensively or wholly absorbed, the patient has eventually been irremediably and completely amaurotic, whatever may have been the measures employed with a view of preventing the loss of vision.

SECTION XII.—OBLITERATION OF THE PUPIL.—OPERATION FOR ARTIFICIAL PUPIL.

I have now to treat of obliteration of the pupil, and the observations I am about to make upon this subject, are intended to refer, in a great measure, to that condition of the iris in which its pupillary margin gradually contracts until it becomes coherent, the pupil being consequently closed, the communication between the chambers of the eye destroyed, and the iris stretched as a continuous membrane across them, separating them into two perfect cavities. This state of things is generally the consequence of inflammation; I have never known it exist as a congenital disease.

The pupil may be filled with a mass of lymph, to which the iris may have become firmly united, that is termed, *a lymph cataract;* the iris may be adherent to the neural surface of the cornea, and the pupil may be at the same time greatly diminished in magnitude, that is called *contraction of the pupil with synechia anterior;* the iris may be adherent to the anterior capsule, which may be at the same time perfectly opaque, and this state of things is designated *synechia posterior with opacity of the anterior capsule;* again, an extensive and dense opacity may occupy the centre of the cornea, so as to prevent the free transmission of light through the pupil. Each of these morbid conditions may require the formation of an artificial pupil, and I shall have to refer to them more particularly when I speak of those diseased states of the eye which render it necessary to make an artificial pupil.

With regard to the treatment of obliteration of the

pupil—simple cohesion of the whole of the pupillary margin of the iris—it is very clear what course should be taken with a view of restoring vision; it is obvious that an opening should be made in the iris as nearly as possible in the place of the natural pupil which has become closed. But before an operation is undertaken, it is highly important to ascertain as correctly as possible the state of the parts beneath, and the condition of the cornea; for, if the cornea be densely and extensively opaque, or the deep-seated parts have undergone any change by which they are unfitted for the purposes of vision, the operation will, always in the latter case and frequently in the former instance, fail to afford relief. We can readily ascertain the state of the cornea by a very slight examination, but we cannot so readily decide upon the condition of the deep-seated textures, of the posterior capsule of the lens, and of the vitreous humor.

The disease which produced the obliteration of the pupil, may at the same time have effected certain morbid changes in the state of the parts beneath, which, whatever may be the magnitude of the pupil, will prevent all useful vision. For instance, it may have rendered the crystalline lens or its capsule opaque, or it may have induced glaucoma, or have disorganized the texture of the retina, or have produced a varicose condition of the vessels of the choroid or retina. Now, inasmuch as all these morbid conditions materially influence the chance and the degree of success after an operation for artificial pupil, it is highly necessary to become acquainted with those circumstances which indicate their presence or their absence.

The history of the case will determine the probable condition of the parts beneath more certainly than any other circumstance, with one exception—I allude to the

power of the patient to distinguish vivid light from absolute darkness, and I may add, the absence of any change in the figure of the eye-ball, and all *obvious* indications of internal disorganization. When the pupil is completely closed, the patient's vision can accomplish little more than enable him to distinguish any sudden transition from total darkness to the most brilliant light; for, although a certain portion of light would pass through the texture of the iris, the pigment coating its neural surface effectually precludes the transmission of any but the most minute quantity, and the impression of light, faint as it is, is only produced when all the circumstances to which I have just adverted are present and combined, namely, *first*, the total closure of the pupil; *secondly*, the perfect or almost perfect integrity of the parts behind the iris; and *thirdly*, the sudden transition from total darkness to an intensely brilliant light. If, in addition to the obliteration of the pupil, the lens or its capsule be opaque, the vitreous humor cloudy from the existence of glaucoma, or the choroid and retina disorganized, or the eye-ball materially changed in its figure, the patient will have scarcely the slightest perception of light.

I need not now mention those circumstances, which, during the existence and progress of iritis, would indicate the extension of inflammatory action to the choroid and retina.

Presuming then that the cornea is quite transparent, that the texture of the iris is moderately healthy, that the form of the eye-ball is unaltered, that the patient has an indistinct perception of vivid light when suddenly contrasted with total darkness, that the eye itself is free from pain and inflammation, and that the patient is in a tolerably good state of health, and is not suffering from gout or any other constitutional disease likely to affect

and injure the eye if rendered irritable by the performance of an operation, we could have no hesitation in assuring him that his case was a favourable one for an operation—the operation for artificial pupil.

There are certain preparatory measures usually adopted prior to the performance of any operation upon the eye which is likely to excite much inflammation, and I shall describe them in detail, when treating of cataract. Entropium, trichiasis, and any mal-direction of the ciliæ, or any mal-position of the tarsal margins which may exist in connexion with a closed pupil, and for the cure of which, so long as blindness remained, the patient would not submit to any operation, should be rectified by the means best adapted to their removal, prior to the formation of an artificial pupil.

When the pupil is closed merely by the cohesion of its pupillary border, when the iris is not unusually close to the cornea, when it has acquired no morbid adhesions to that texture, and when the cornea, the crystalline lens and its capsule, are perfectly healthy and transparent, there is one operation so well adapted to this state of things, and so far preferable to every other, that I may say it is universally adaptive and always to be selected, and I shall proceed to describe it leaving for after consideration the enumeration of those circumstances which would render a deviation from this plan necessary.

Operation.—Having placed the patient upon a table as for the operation of extracting the lens, and requested an assistant to secure the upper lid against the obitar margin without pressing upon the globe, and having drawn down the lower eye-lid with the fingers of the left hand (presuming that you are about to operate upon the left eye) you would puncture the cornea (a little above a line drawn across its greatest diameter) at its temporal side

with a cataract knife, and carry its point *nearly* to the opposite side of the cornea, you would then withdraw the knife and close the lids for a few seconds; then again separate them, and, if the iris do not protrude at the corneal opening on the employment of the slightest possible degree of pressure upon the eye-ball, pass a fine hook beneath the cornea into the iris, then draw it outwards, and with a fine convex-bladed pair of scissors, snip away the portion of iris which is protruded by the hook.* The eye may then be loosely bandaged, light

* The following case will illustrate some important points of practice to which I have alluded in the text:—W. Nesbitt, æt. 25, (residing at Wolverhampton) has lost the sight of the left eye. The right eye-ball is of its usual size, and degree of firmness. The upper two-thirds of the cornea is densely opaque and slightly projected, the whole of the pupillary margin of the iris is adherent to the diseased cornea except a small portion at its lower part which is just visible by looking beneath the opacity. The lower part of the cornea is healthy, and as the patient can distinguish suddenly contrasted degrees of light, it is presumed that the lens is transparent. With the assistance of my excellent and much respected friend Mr. S. Partridge, I performed the following operation with the happiest result.—Having the patient seated upon a chair at a convenient height, and having the upper lid carefully raised and securely fixed to the obitar margin without the slightest compression of the globe, I made a small incision with Beer's knife af the lower part of the cornea, as nearly as possible at its junction with the sclerotica, and as the iris did not prolapse, I very slowly and cautiously introduced a small hook beneath the corneal flap, drew outwards a small portion of the iris, and excised it with the convex-bladed scissors.

After Treatment.—A thin fold of linen was placed upon the eyes and secured by a narrow roller passed lightly round the head. The patient was then conducted to bed, and kept perfectly quiet. The diet consisted chiefly of tea and gruel for about a week; he was bled two days after the operation, and took a sufficient quantity of mercury to affect the gums very slightly.

Result of the case.—The lower part of the cornea is perfectly clear, and opposite to this clear portion of cornea, there is a small and angular, but perfectly clear, pupil. His vision was so much improved two months after the operation, that he could very safely walk about without assistance, which he had not done for some years before; but at this period he received a blow upon the eye, which ruptured the cornea midway between its inferior margin and the lower edge of its opaque portion.

excluded, and means adopted, as circumstances may require, for the prevention or subduction of inflammation; for, acute inflammation is very apt to occur after injury of this nature and extent has been inflicted upon so vascular and delicate a part as the iris.

When the punctuation of the cornea is completed, it is preferred by some surgeons to introduce GIBSON'S scissors within the opening, and to transfix the iris with its point, which, for this purpose, should be carried a little obliquely backwards towards the opposite side of the eye, the blades of the scissors are then to be closed, so as to form a flap of the iris which may be snipped away, so as to make an aperture in the iris as nearly circular as possible. MR. GIBSON advises, that the extraction knife be passed through the iris soon after it has passed through the temporal side of the cornea—that its point should enter the iris soon after it has transfixed the cornea, and be brought out at a short distance beyond, so as to form a small flap (its lower border being of a convex figure) which may afterwards be snipped away by the iris scissors.* However, he very judiciously advises that the opening in the iris be made at the same time that the

Remarks on the preceding operation.—The incision of the cornea was made so close to its margin, because there was but an exceedingly small part of it which retained its transparency; and I was especially desirous to avoid any pressure upon the eye-ball whilst making, and after having made, the incision of the cornea, lest I should dislocate the lens. Had the lens been present, I should have employed pressure upon the globe, as enabling me to make the corneal section more easily and perfectly, and also as a means of causing the protrusion of the iris which, in consequence of the adhesion of the major part of its pupillary margin to the corneal opacity, I was compelled to draw downwards with the small hook, at some risk and with the greatest possible difficulty.

* The same kind of operation was performed, and most accurately described by WENZEL, several years before MR. GIBSON published upon the subject.

cornea is divided only in those instances where the lens and its capsule are removed from the axis of vision. It is evident, that if the lens is transparent, and remains in its proper situation, it will be very likely to be punctured, and consequently to become opaque, by the section of the iris performed in the manner previously described.

Now, what injurious occurrences are chiefly to be apprehended after the performance of any operation of this description? Undoubtedly, inflammation of the iris and closure of the pupil; for the former of these conditions I have already suggested that it might be necessary to have recourse to various antiphlogistic measures, the administration of mercury, and so on; and to obviate the latter, it would, of course, be right to smear upon and above the eye-brow, the extract of belladonna. This should be done immediately after the operation has been performed, and repeated every twenty four hours, for many days, until, at least, the tendency to contraction of the pupil is entirely removed.*

When we examine the eye the day after the performance of the operation, we find, perhaps, that the anterior chamber is full of blood, and the iris so much obscured as to be scarcely at all visible. This is of little importance; the vessels of the iris have bled and the hemorrhage has become confined in the chambers of the eye, but it will all become absorbed, and will not be likely to thwart the success of the operation.

† Whatever may be the arrangement of the iritic fibres, I am satisfied that when an artificial pupil has been formed by their division with a sharp needle or iris knife, so as to cause, soon after the operation, the formation of a very ample pupil, its closure is very likely to take place if acute iritis occur—the inflammation has, in fact, the same tendency to lessen the magnitude of the pupil, as it possesses when present in an iris upon which no such surgical operation has been performed; and I am also assured that the effect of belladonna in opposing this disposition to contraction, is very considerable.

With a knowledge of the effects of this operation which are chiefly to be dreaded, that is, inflammation of the iris and closure of the pupil, it is a question how far the administration of mercury becomes necessary as a general rule of practice. I have usually employed it, and, as I think, with the greatest advantage.

Such, then, is the operation to be selected when the cornea, the lens, and its capsule, are transparent, the iris neither adherent to the cornea nor to the anterior capsule, and the pupil merely closed by the cohesion of its pupillary margin, and it has, in all essential respects, the sanction of having been recommended and practised by JANIN, PLENCK, GUERIN, FLORENZA, ARNEMAN, JURINE, GLEIZE, BEER, WENZEL, DEMOURS, SABATIER, MAUNOIR, WARE, GIBSON, and RYAN.

The pupil may be closed, the lens and its capsule removed from the axis of vision, and the iris may be more or less extensively adherent to the cornea, which may be more or less extensively opaque. If, in such case, you could not conveniently puncture the cornea with a cataract knife in an eligible situation, you might attempt to divide the iris towards its centre by means of a straight cataract needle, or an iris knife, (such as was originally contrived by Sir W. ADAMS, and which may be seen in the engraving in his *book*) introduced at about two or three lines behind the margin of the cornea, but not exactly on a line with its greatest diameter on account of the long ciliary artery. By means of this operation, which was first suggested in 1728, by CHESELDEN, you may sometimes form an aperture in the iris sufficiently large for the purposes of useful vision, but it is much more probable that, in your attempts to divide the iris, you will tear it from its ciliary attachment, which is the very worst method of making an artificial pupil notwith-

standing the eulogies it has received from Scarpa, Schmidt, Reisinger, and others, unless the cornea be so extensively opaque, that only a small portion of its nasal margin is healthy and transparent. This effect is not always nor frequently owing to the want of a proper degree of dexterity in the manipulations, or to any defect in the instruments employed, for it may happen to the most expert operators with the best needle or the most perfect iris knife that can be procured. This detachment of the iris from the ciliary ligament is owing to the firmness of the iris at that part (its centre) you are anxious to divide, to the want of some support to the point of the instrument and the central part of the iris, and to the slightness of the connexion subsisting between the iris and the ciliary ligament.

In the attempts to form an artificial pupil, according to the preceding method, the iris may be detached from the ciliary ligament in two modes:—in the first place, the point of the instrument may push the iris forwards (towards the cornea) instead of transfixing it, and in this way so far stretch the iris as to lead to its detachment; in the second place, the iris, instead of being divided, may be pulled with the point of the needle or the edge of the knife, (especially when they are moved backwards and outwards) and torn from its ciliary attachment. I have seen the iris knife or a cataract needle passed through the sclerotica, the iris pushed before its point against the cornea, and the operator, too anxious to effect his object, has urged the instrument *through* the cornea, and at the same time detached the iris from its ciliary connexion.

Where you have a choice of situation, and can make the pupil at any part of the iris you please, it would be desirable to select the central or lower part, because patients see much better when the pupil is so situated,

and particularly when it is centrally situated, than when it is made opposite the highest point of the cornea or to either side; but this circumstance will be chiefly determined by the state of the cornea, for, of course, if any opacity of the cornea which did not admit of removal, existed at its lower part, you would be anxious to remove the pupil as much as possible from that part, but whenever you can procure the absorption of an opacity of the cornea, by a little perseverance in the use of the means ordinarily employed for that purpose, it is desirable to do so before undertaking an operation for artificial pupil.*

I have pointed out the kind of operation it would be advisable to perform when the cornea, the lens and its capsule, are transparent, when the *structure* of the iris is unchanged, and the pupil closed merely by the cohesion of its pupillary border, and I have also pointed out that a different plan of practice would be required when the cornea was pretty extensively opaque and the iris adherent to its neural surface, but there remain other morbid states of the eye which may call for a different mode of procedure.

* If we had no other inducement to perform an operation for artificial pupil, the hint we sometimes receive from nature would be sufficient to satisfy our minds respecting its occasional propriety; for, it will be remarked, that persons who have been blind for many years, in consequence of the closure of the pupil, will sometimes acquire, very unexpectedly to themselves, a much increased perception of light, and on examining the eye immediately after the announcement of this change, it will be noticed, that the fibres of the iris have separated; there will exist a separation of the iritic structure at some part or other, which permits that augmented perception of light which they have, as they term it, miraculously obtained. This is Nature's mode of making a second pupil, and many persons who had relinquished all expectation of recovering the sight of an eye which had been long lost in consequence of the obliteration of the pupil, have been induced, by the occurrence of this accidental separation of the iritic fibres, to apply for that relief which has eventually procured for them very useful vision.

If the cornea were transparent and the iris adherent to the anterior capsule which, together with the lens, were opaque, you might, *a priori*, judge it absolutely necessary as a preliminary measure to attempt the cure of the cataract by the needle operation. If you were of this opinion you would first destroy the adhesion of the iris to the anterior capsule, break up the lens if it be soft, and depress it if it be hard, by introducing a suitable needle behind the margin of the cornea; and, at a subsequent operation, either enlarge the pupil or remove a central portion of the iris, just as the state of the pupil left by the first operation might render necessary.*

The morbid states of the eye which may require the formation of an artificial pupil are exceedingly various, so various, as respects their details, that I can do little more than furnish a summary statement of those diseased conditions of the organ of vision which may render such an operation requisite, and at the same time point out the principles which would induce you to select any particular operation for that purpose.

1.—The cornea, the lens and its capsule, may be transparent; the iris may not have acquired adhesions to surrounding parts, nor have sustained much structural alteration; the eye-ball may exhibit no change of figure, and the retina may be inferred to retain a considerable degree of sensibility.

* This is one mode of managing these complicated cases, but the operation I prefer is essentially the same as that recommended by Scarpa, in a letter addressed to Maunoir, of Geneva, and published in the seventh volume of the *Medico-Chirurgical Transactions*. I make a pretty free incision of the cornea, and a smaller one of the iris, with Beer's knife, introduce Maunoir's blunt-pointed scissors, and enlarge the opening in the iris, so as to permit the easy transit of the lens and its capsule, (which I remove by the small hook if necessary) and finally excise the flap of the iris by means of the small scissors.

Operation.—Introduce BEER's knife at the temporal side of the cornea, as for the operation of extraction, and carry its point nearly to its opposite or nasal side, then withdraw the instrument, and if a sufficient portion of the iris protrude through the opening, snip it away;* but, if otherwise, if the iris does not sufficiently protrude after having employed a sufficient degree of pressure upon the eye-ball, introduce the small hook, transfix the iris, and draw that quantity of it through the corneal aperture, it is necessary to excise. If the opening in the cornea be made too large, there is a risk of the occurrence of staphyloma; if, on the other hand, it be too small, the iris will not be likely to protrude sufficiently, neither can the hook be readily introduced through the diminutive aperture, or safely used when it has been introduced. After an operation of this description, the artificial pupil is usually situated towards the corneal section, so that it is desirable, that this section should be placed as near as possible to the corneo-sclerotic junction, chiefly because there usually occurs a certain degree of opacity around an incision of the cornea.

2.—The former state of things may exist, except that the cornea may be more or less extensively opaque.

Operation.—In this case, the pupil should, of course, be made away from the situation of the opacity of the cornea. And the same kind of operation as that I have just described, may be adopted with some slight modification; for GIBSON's scissors may be made to operate upon

* MR. GIBSON insists upon the importance of not attempting to make an opening in the protruded bag of iris, until a sufficient quantity of that membrane is projected through the corneal section; for, as he correctly remarks, as soon as the prominent portion of the iris is opened, the aqueous humor which urged it outwards is immediately discharged, and the iris retires within the eye.

any part of the iris. Having punctured the cornea with BEER's knife, the iris-scissors may be introduced within the opening, the sharp blade passed into the iris and pushed obliquely onwards, and a portion of the iris opposite the transparent part of the cornea, excised, and withdrawn by means of the small forceps.

If the cornea is opaque throughout the whole of its texture, except a small portion towards its margin, it would be better to introduce a small needle, as for the posterior operation of solution, and having passed its point through the iris, you may, by carrying it downwards and backwards, generally succeed in detaching the iris, from its ciliary connexion, at any part of its circle that may be preferred.

3.—The lens and its capsule may be transparent, but the pupil may be closed, and the iris may be more or less extensively adherent to the cornea, which may be opaque only at those points at which the iris is so attached.

Operation.—Make a small section of the cornea near to its margin, and if the iris be slightly adherent to the cornea, detach the adhesion with a sharp-edged needle, and afterwards excise a portion of the iris, which may have been made to protrude through the corneal section; if the iris be even more extensively adherent, the same method of treatment will be required, but it may be necessary, perhaps, to destroy the adhesions subsisting between the iris and the cornea at one operation, and at a subsequent one, to excise a portion of the iris, just as though no synechia anterior had previously existed. Where only one or two points of the iris have been but slightly adherent to the cornea, I have sometimes made no attempt to separate them, but having carefully hitched the small hook in the texture of the iris, by inclining its sharp point in a very slightly oblique direction backwards,

(lest the lens or its capsule should be punctured) I draw it outwards; and I have rarely found that this large pupil, formed by the laceration of the iris, has subsequently closed. The best hook for this latter purpose, is that which forms an acute angle with the shaft of the instrument.

4.—The cornea may be healthy, but the pupil may be closed, and may be extensively adherent to the anterior capsule, which, together with the lens, may be opaque.

Operation.—In this case, you would first depress the lens if it be hard, and if soft, you would try the effect of the posterior operation of solution; when the lens is either depressed or absorbed, and nothing but the opaque capsule, which is adherent to the iris, remains, you would make a small incision of the cornea, as I have before recommended, introduce the small scissors within the aperture in their closed state, and having so introduced them beneath the corneal flap, slightly separate them and direct the sharp blade obliquely backwards through the iris for a short distance, then close their blades, and excise, and remove in the usual way, a portion of the iris towards its centre. Or you would perform (and I much prefer it) the operation I have recently described as being essentially the same as that recommended by SCARPA, in a letter addressed to Professor MAUNOIR, of Geneva.

Now, in studying this rather complicated subject, you will perceive the great advantage, the absolute necessity, of adopting some clear arrangement; you will perceive, that unless you arrange the combinations of disease which may exist and require the formation of an artificial pupil, and classify the many circumstances which may render necessary a modification of treatment—a variation in the mode of performing any kind of operation for their removal—you will fail to obtain any clear and definite

notions concerning them; you will be perplexed by the multiplicity of the minutiæ, and the number of the more or less important complications which will present themselves to your notice. I have been in the habit of recommending medical students in particular, to arrange those states of the eye which may require the formation of an artificial pupil, in the following manner:—

1.—The pupil may be obliterated by the cohesion of every part of its pupillary margin—this diseased state may exist, and the eye may be in other respects perfectly healthy, except that the lens and its capsule are absent.

2.—The pupil may be obliterated, and the lens and its capsule may be present, which may either retain their transparency or have become opaque.

3.—The pupil may be closed or nearly so, and the iris may be more or less extensively adherent to the cornea.

4.—The pupil may be closed or nearly so, and the iris may be more or less extensively adherent to the capsule of the lens.

5.—The pupil may be filled with a mass of lymph to which the pupillary margin of the iris may have become firmly attached.

6.—The pupil may be closed or nearly so, and the cornea may be more or less extensively opaque, and the iris may or may not be adherent to some part of the opaque portion of the cornea.

Other combinations of disease may exist, but I have enumerated those of most frequent occurrence; and in all these cases an operation for artificial pupil may be required, and in the previous enumeration of symptoms I have therefore presumed that the figure of the eye-ball has not undergone any material alteration, and that the deeper-seated textures of the eye are, as correctly as the

nature of the case permits the inference to be drawn, fitted for the purposes of vision; for if any of these occurrences exist or have taken place, then, of course, the necessity of an operation is out of the question. And, finally, *as respects the iris*, three kinds of operation are employed, —the operations for the artificial pupil may be, as relates to the iris, arranged under three chief divisions, namely:—

1.—Detachment of the iris from the ciliary ligament. [See the opinions of ASSALINI, RICHERAND, SCARPA, SCHMIDT, REISINGER, LANGENBECK, GRAEFE, BEER, HIMLEY, JAEGER, and WELLER, as contained in their respective works, or papers published in various Journals.]

2.—Simple division of the *structure*, or, as it is commonly termed, the *fibres* of the iris.* [See upon this mode of practice the statements of CHESELDEN, SHARP, MORAND, JANIN, WARNER, RICHTER, PELLIER, MAUNOIR, WARE, ADAMS, MONTEATH, and TRAVERS.]

3.—Excision of a portion of the iris. [See the opinions of WENZEL, GENDRON, GUÉRIN, DEMOURS, SABATIER, GIBSON, TRAVERS, and RYAN.]

Now, these respective operations are generally performed alone, that is, either the iris is divided, or it is separated from its ciliary attachment, or a portion of it is excised; or two of these operations may be combined, for example, the iris may be separated from its ciliary attachment, and a portion of it may then be excised, with a view of increasing its magnitude, and insuring the permanency of the pupil which is formed.

* This operation should never be performed unless the iris is tolerably healthy in its texture, the lens and its capsule removed from the axis of vision, the pupil quite or very nearly closed, and unless there is present that appearance which would be produced if the iris were put upon the stretch—the iris will not sufficiently contract towards its ciliary margin to maintain the due patency of the pupil unless it is in a tolerably healthy state.

If too considerable a portion of the iris be removed, or if the artificial pupil be exceedingly large, the patient will suffer all the disadvantages connected with a state of mydriasis; and it may be necessary to make an aperture in the cornea, and to place a portion of the loose border of the iris within the lips of the incision so as to diminish its magnitude.

When the cornea is densely opaque throughout its entire surface it has been proposed to make an artificial pupil by excising a portion of the sclerotica near to the corneal margin, and afterwards removing a corresponding portion of the choroid, but I need scarcely mention that this operation (which was first proposed by Professor Autenrieth, and has been repeated by Beer, Ammon, and others) is now altogether abandoned. It is, however, said to have succeeded in animals.

In all cases where you are required to perform an operation upon both eyes it is desirable to make the pupil in each organ correspond, as nearly as possible, in form and in situation—you would not, for instance, unless compelled to do so by particular circumstances, make one pupil towards the nasal and the other towards the temporal side of the eye, but as nearly in the same situation with respect to the iris, as possible. And, of course, it would not be desirable to perform an operation for artificial pupil upon one eye so long as the vision of the opposite organ was sufficient for all the ordinary purposes of vision.

Having stated my own opinions in reference to nearly all the practical points and considerations connected with the obliteration of the pupil, and those pathological conditions of the eye which render the operation for artificial pupil necessary, I shall briefly direct the attention of those who are desirous of obtaining the most ample information upon the subject, to the *article* "Iris" in the

Dictionaire des Sciences Médicales, to the *article* "Pupil" in the last edition of MR. COOPER'S *Surgical Dictionary*, and to the very excellent works of GUTHRIE,* MACKENZIE,† LAWRENCE,‡ GIBSON,§ and ADAMS.‖ The five first mentioned works contain an elaborate and well compiled history of the disease and of the various operations and their infinite modifications which may be required for its cure, together with an account of almost every pathological condition of the eye, which may demand and justify the operation, and the works of GIBSON and ADAMS are chiefly occupied in suggesting some particular modes of operation which an extensive and most successful practice had induced those authors to recommend to their professional brethren.

* *Lectures on the Operative Surgery of the Eye.* London, 1830, page 421.

† *A Practical Treatise on the Diseases of the Eye.* London, 1830, page 660.

‡ *A Treatise on the Diseases of the Eye.* London, 1833, page 452.

§ *Practical Observations on the formation of an Artificial Pupil, &c.* London, 1811.

‖ *Practical Observations on Ectropium; on the modes of forming an Artificial Pupil, &c.* London, 1812, page 21.

CHAPTER VIII.

VARIOUS PRETERNATURAL STATES OF THE PUPIL AND IRIS.

SECTION I.—VACILLATION OF THE IRIS.

By vacillation of the iris is meant a peculiar tremulous quivering and wavering motion of that membrane during the movements of the eye, or of the body.* It occurs sometimes after the operation for cataract; after a blow upon or concussion of the eye-ball; and in connexion with certain other morbid conditions of the eye and various diseased states of the system.

It is not *essentially* necessary to the vacillation of the iris that the crystalline lens should be absorbed, nor that the septa of the vitreous humor should be destroyed, and the density of that humor diminished. Vacillation of the iris sometimes occurs immediately after the infliction of a blow upon the eye. Vacillation of the iris has also taken place under my own observation in connexion with some nervous affections† and has, in some cases, very speedily

* "Sometimes the iris has a very singular undulatory motion, being agitated to and fro *like a piece of cloth exposed to a fluctuating wind*." WARDROP, page 49.—"When the natural support, which the iris receives from the parts behind, is lost, it shakes backwards and forwards *like a rag in a bottle of water*." LAWRENCE, page 394.

† I related the following case in the second volume of the *Midland Reporter*, some years ago. "A gentleman, rather advanced in life, has been slightly palsied for some years. He has also a vacillating state of the iris, although vision, considering his age, is remarkably

succeeded the performance of the posterior operation of solution, or the operation of keratonyxis, where the iris itself has happened to have been injured. Now, taking all these facts into consideration, what inference can be drawn respecting its cause? It cannot be generally owing to the mere absence of the lens, for it is not an usual consequence of the operation of extraction when properly performed. It cannot therefore, I repeat, be, in the general, dependent on a mere want of support from behind. After a minute and most attentive investigation of this subject, after having witnessed the occurrence of vacillation of the iris in persons from whom the lens has never been removed by an operation, and whose vision has been tolerably good without the aid of glasses—its occurrence too soon after the infliction of a blow or other injury, to allow of the absorption of the crystalline, and where no other evidence (than the tremulous state of the iris affords) of the displacement of the lens, has existed—its occurrence as a congenital affection—its supervention upon paralytic affections and on the infliction of certain injuries upon the eye-ball where it was most probable that some one of the ciliary nerves had been lacerated—I repeat, that after having witnessed its occurrence under these and a variety of other circumstances, I am induced to believe that it is essentially dependent on some nervous irritation or injury (most probably of the lenticular ganglion, or the ciliary nerves) the precise nature of which I have not yet discovered to my own satisfaction. I have also seen it

strong; he has met with no accident, and has been the subject of no operation upon either of his eyes; he has never worn spectacles, and is neither far nor near-sighted. I cannot learn whether or not this condition of iris existed prior to the palsied affection of the muscular system, nor can I ascertain how far it has increased with the progression of the more important malady."

frequently where the crystalline lens has been absorbed, or where the vitreous humor has been diminished in its density, so that it does not appear improbable that these conditions of disease assist, at least, in producing this fluctuating motion of the iris although they are not perhaps adequate *per se* to produce it. I know that this peculiar movement of the iris has been said to depend always and altogether on the want of support that membrane sustains from the absorption of the lens or the diminished density of the vitreous humor, but I am satisfied that this opinion is erroneous.* The iris will sometimes contract and dilate under such circumstances, but it does so neither in so complete nor in so rapid a manner as it did in its natural state. The support the iritic structure derives from its serous membrane appears to promote the steadiness and equality of its action.†

In those instances where the iris vacillates soon after a severe blow upon the eye, or after a violent fall which has not visibly impaired the transparency of any of the

* The dependence of vacillation of the iris on, what is phrased, "solution of the vitreous humor," is particularly referred to by TRAVERS, (*A Synopsis of the Diseases of the Eye*, page 203.) WARDROP, (*The Morbid Anatomy of the Human Eye.* Vol. ii. page 50.) WELLER, (MONTEATH'S translation of *A Manual of the Diseases of the Human Eye.* Vol. ii. p. 30.) GUTHRIE, (*Lectures on the Operative Surgery of the Eye*, page 411.) FRICK, (*A Treatise on the Diseases of the Eye*, page 222.) MACKENZIE, (*A Practical Treatise on the Diseases of the Eye*, page 698;) and LAWRENCE, (*A Treatise on the Diseases of the Eye*, page 394.)

† In the course of some observations, I published many years ago, [See *Midland Reporter.* Vol. 2. These remarks were afterwards reprinted in the sixth volume of the *Medical Gazette*, and also in the eighteenth volume of the *Lancet.*] respecting the causes of vacillation of the iris, I referred to the support the iritic fibres derived from their serous covering in the following terms:—"The membrane of the aqueous humor, which covers the front (*corneal*) and back (*neural* or *capsular*) surface of the iris, appears not only to be subservient to the purposes of secretion and absorption, but to render the same support to the iris as fasciæ afford to muscles."

textures or humors of the eye, it may perhaps happen that the lens has become dislocated below the pupillary margin of the iris, but it must be remembered that the effect of this injury, namely, vacillation of the iris, may only be partially owing to the lack of support occasioned by the displacement of the crystalline.

This imperfection (it can scarcely be called a disease) requires no specific plan of treatment on its own account, and no remedies applied to the eye itself have the slightest beneficial influence upon this very singular affection. I have never known it to be removed whenever it had existed to any decided degree, whatever may have been the cause from which it has appeared to arise.

SECTION II.—MYOSIS.

There are certain changes in the magnitude of the pupil which are found to be connected with particular morbid conditions of the system and various diseases of the eye, and in other instances to result from age alone. Contraction with impairment or loss of the mobility of the iris is one of these changes.

Sometimes the pupil is naturally very small (the pupil of persons whose complexion is fair and whose hair and eyes are light-coloured, is always smaller than in those individuals who have dark hair and dark eyes) and that too without occasioning any actual defect of vision—I mean relatively small with regard to the size of the cornea and the magnitude of the eye-ball, and small in reference to the usual magnitude of the pupillary aperture in persons generally, and under ordinary circumstances. This is the simple *congenital myosis* and is not productive of any impairment of vision. In old age the pupil becomes

contracted, the iris often approaches the cornea, and the extent and activity of its motions are much diminished. This then is another form of myosis *(phthisis pupillæ)* which cannot be remedied. Now, the *myosis congenitalis* and the *myosis senilis* are both presumed to be unconnected with disease (unless the changes produced by old age merely can be termed morbid phenomena) and unproductive of, though not always unassociated with, any materially injurious effect upon vision. Inflammation of the iris and of the deep-seated textures are usually attended with a contracted state of the pupil. Employing the eyes frequently upon polished and minute objects, or the attentive inspection of objects either in a very light apartment or by means of a brilliant artificial light, will often induce a contracted state of the pupil, *ex consuetudine*, without, however, necessarily leading to any dimness of vision, as regards, at least, the mere diminution of the pupillary aperture. Myosis has been said to arise in consequence of a spasmodic condition of the orbicular fibres of the iris, and also from a paralytic state of its radiated ones, and this opinion may or may not be correct, but as yet it remains to be verified, for no evidence hitherto presented in its favour amounts to proof. Inflammation of the brain is commonly attended with a contracted state of the pupil,* and I have seen a similar condition of the pupil produced by the free administration of narcotics, and the same circumstance has been pointed out by Mr. Dalrymple in the first volume of the *Journal of Morbid Anatomy*.

According to this statement of the various circumstances

* The dependence of myosis on an excited condition of the brain did not escape the notice of Banister. In the chapter of his *Treatise* which treats of "the consumption of the apple of the eye," he says the disease "may bee ingendred through extreme ach of the head."

under which myosis occurs, it may exist, *first*, as a congenital state; *secondly*, it may arise as one of the customary changes connected with old age; *thirdly*, it may be excited by inflammation or increased susceptibility of the retina, or of some of the other deep-seated textures of the eye; *fourthly*, it may be produced by the excessively free administration of narcotics; and *fifthly*, by spasm of its orbicular or palsy of its radiated fibres.

Treatment.—The treatment will of course be modified by the nature of the disease from which it is presumed to arise, in all those instances where it can properly be designated a morbid affection. In many cases it does not require any treatment, nor admit of any relief; for instance, congenital myosis does not require medical assistance, nor can we relieve that state of myosis which constitutes one of the customary changes effected by age, nor that which is left after an attack of iritis which has long since subsided, unless, indeed, by the performance of a surgical operation. On the other hand, if it takes place in consequence of overworking the eyes, or by subjecting them to the prolonged influence of a brilliant light, or by employing them in the inspection of minute polished substances, it would be right to direct a suspension of labour and a removal of the cause of injury; and if this advice is strictly followed, it will be generally succeeded by a cure. If the myosis arise in connexion with an increased susceptibility of the retina, of inflammation of the deep-seated textures of the eye, or of phrenitis, you would, of course, direct your chief attention to the more important affection.

SECTION III.—MYDRIASIS.*

The opposite state of the pupil to contraction sometimes exists, in connexion also with various morbid conditions of the iris, the eye, and the system. The enlargement of the pupil may be induced either by the internal administration, or by the local application of various narcotic substances, but, as I have before stated, we may produce myosis—a state of the pupil such as exists during sleep—by placing the system under the influence of opium, belladonna and other narcotics. Again, it has been supposed to take place either from palsy of the orbicular, or spasm of the radiated fibres of the iris. It may also exist as a congenital condition, and may not lead to any appreciable defect of vision. Various states of the brain produce mydriasis, and they are generally such as give rise to a certain amount of pressure, and we often witness this enlarged condition of the pupil in connexion with apoplexy, intoxication, and the latter stages of hydrocephalus. A blow upon the eye or concussion of the eye-ball are occasionally followed by a permanently dilated state of the pupil, which state of mydriasis may either be dependent on concussion followed by paralysis of the retina, or on mere paralysis of the iris. And lastly, it may exist as a symptom of amaurosis, or be excited by

* Demours has given a very elaborate account of mydriasis in the first volume of his *Work*. He has defined the affection in the following terms:—"La mydriase est une maladie dans laquelle la pupille se trouve dilatée et immobile, et reste dans cet état, à quelque degré de lumière qu'on expose l'œil, quoique les rayons parviennent sans obstacle, et agissent librement sur l'organe." *Traité des Maladies des Yeux*, page 434.—This subject is also elaborately discussed by Jourdan, in the twenty-sixth volume of the *Dictionaire des Sciences Médicales*.

gastric or intestinal irritation; thus, children who are afflicted with worms will often be affected with mydriasis.

The dilatation of the pupil, to which I am now referring, may occur gradually, or it may be produced suddenly; but this will chiefly depend on the nature of its cause. It may exist only in a slight degree, the pupil may be rather, but not materially larger than it ought to be, or the iris may be drawn towards the ciliary ligament until it appears as an extremely narrow ring.

The extent to which it may affect vision will also vary, for, when it exists from birth, the pupil being merely rather larger than is usual, it may not be attended with any imperfection of sight whatever, whilst in other instances, vision may be totally destroyed—as occurs in some examples of amaurosis and hydrocephalus. However, the mere dilatation of the pupil is not in itself the cause of the dimness of vision, except where it arises from an irritable state of the radiated or a palsied condition of the orbicular fibres of the iris, both of which conditions are, however, merely hypothetical causes of the mydriasis; but, when they do exist, are presumed to depend on irritation or injury of the ciliary nerves, or of the lenticular ganglion. Now, in such case, the retina being healthy, or nearly so, the increased quantity of light it will be compelled to sustain by reason of the great expansion of the pupil, will lead to serious confusion and impairment of vision.

There is a dilated state of the pupil produced by the passage of a large hard lens in the operation of extraction, unconnected with any affection of the retina, and which would appear to be owing to an atonic state of the iris, induced by the forcible compression its pupillary margin sustains during the passage of the lens. We know that the arterial tunics (and more especially their muscular

fibres) may be so distended by long continued inflammation, that they may never afterwards have the power of re-assuming their original dimensions; and this is the more likely to happen if the distending force operate suddenly, before they can accommodate themselves to its operation; and, the tonicity of the orbicular fibres of the iris may, in a similar way, be at once destroyed, and instantaneously prostrated, by the forcible distention they suddenly experience, under the circumstances to which I have just referred.

The iris, like the muscular parts of the body, becomes morbidly limited in its sphere of action, if circumstances, favourable to such limitation of action, remain in operation for a long period, and, on this principle, a state of mydriasis may be induced by withdrawing for a long space of time a great part of the light to which the retina ought to be, and had previously been, subjected; permanent dilatation of the pupil, may, in fact, occur, *ex consuetudine*. Persons confined to a dark room for many months, will be a long time before they can bear the natural light of day, and that, not only because the retina is introduced to a stimulus, which, contrasted with that to which it had been recently subjected, must be considered extremely powerful, but also because the iris will not close the pupil so efficiently as formerly, in consequence of the dilated state in which it has been permitted to remain for so long a time, by which the orbicular fibres of that membrane have been less frequently called into action than usual, and then only required to act in a much more limited sphere. Demours has entered somewhat minutely upon this subject, and has very satisfactorily pointed out the necessity and occasional practicability of inducing contraction of the pupil; and, of course, this practice is particularly applicable to all those cases

where the orbicular fibres of the iris have become paralyzed from the passage of a large hard lens through the pupil, or where the sphere of action of the iris has become limited in consequence of the comparative disuse of its orbicular fibres. And how is this contraction to be effected? I confess that I cannot strongly recommend the use of powerfully stimulating remedies for this purpose, such as the solid nitrate of silver, for, as there generally exists a necessity for repeating any application it may be deemed necessary to employ for the accomplishment of this object, very many times, there is, of course, a great risk of exciting, by the agency of the remedy, a worse disease than that it was intended to remove. I should, at all events, recommend you to try the effect of the vapour of æther or the influence of electricity, first, and if this plan fail, then you may have recourse to the following practice:—with a piece of the nitrate of silver worked to a very fine point, touch the cornea nearly at its junction with the sclerotica, according to the method of SERRES; this may be done every day, or every second day, taking care, however, not to repeat the application so often as to produce any severe inflammation. It will be remembered, that these remedies are solely applicable to the atonic state of the orbicular fibres of the iris produced by the sudden and forcible propulsion of a large hard lens through the pupil, unconnected with laceration of its border, or to that sluggish state induced by the habitual expansion of the pupil from long continued confinement in a dark situation, or to mydriasis produced by a blow upon the eye or fall upon the head unassociated with a state of inflammation.

Congenital mydriasis rarely exists to any extreme extent, is not attended with any impairment of vision, and does not require, nor is it benefitted by, medical or surgical treatment. Mydriasis existing as a symptom of

amaurosis requires no treatment directed solely with a view of promoting the mere contraction of the pupil—the treatment of the dilatation of the pupil is but the treatment of the amaurosis upon which it depends.

Persons suffering from mydriasis will sometimes derive relief from the use of an instrument with a small aperture in its centre—an aperture rather smaller than the natural pupil; but those cases only are benefitted by its use, where, although the retina retains its ordinary degree of susceptibility, vision is obscured by the too free and abundant admission of light through the preternaturally large pupil. The treatment of such cases will, however, mainly depend on the nature of the exciting cause, and will be guided by the disease from which the mydriasis arises in those instances where it is found to exist merely as a symptom of some important morbid affection.

Sometimes one eye only is affected with mydriasis, and this is the more likely to happen if the mydriasis occur as a congenital disease, but it will not be forgotten that not only are the pupils sometimes of a different size from each other from birth, but that the colour of the complexion and of the eye-lashes, the mode in which the eyes have been exercised, and the degree of light to which they have been for the most part subjected, influence, either for a temporary or permanent season, the magnitude of the pupil.

SECTION IV.—PARALYSIS OF THE IRIS.

The iris is sometimes paralyzed in connexion with certain morbid states of various parts of the system or of the system generally; paralysis of the iris may also arise from various morbid affections of the eye itself; but I shall treat more particularly upon this subject in my remarks on cataract and amaurosis; and I have already

referred to it in the course of my observations on myosis and mydriasis. In true paralysis of the iris, that membrane has lost all power of contracting and dilating, the size of the pupil remains stationary—its magnitude never varies—and the iris sometimes acquires a vacillating motion.

SECTION V.—OF THE PERMANENT PUPILLARY MEMBRANE.

The pupil is occupied during the greater part of fœtal life by an extremely vascular membrane which prevents the retraction of the iris, and retains it in one fixed position, so that its development, and more especially the development of its vascular system, may be rendered the more perfect. It becomes comparatively thin and transparent towards the seventh month, and is either ruptured or quite absorbed (?) a few weeks prior to birth, or it is ruptured by the first movements of the iris.

There is a description of this membrane and an account of the circumstances connected with its discovery, and also many curious particulars relative to its anatomy and physiology, in the writings of HALLER,* WRISBERG,† ALBINUS,‡ ZINN,§ BÆRENS,‖ HUNTER,¶ BICHÂT,** BELL,†† WENZEL,‡‡ SABATIER,§§ and DALRYMPLE.‖‖

* *De nova tunica pupillam fœtus claudente. Opera Minora.*
† See *Med. and Phys. Com.* Edinburgh. Vol. 1.
‡ *Academicæ Annatationes.* 1758.
§ *Decriptio Anatomica oculi humani.* 1755, p. 94.
‖ *Scriptores Ophthalmologici Minores.* Edidit JUSTUS RADIUS. Vol. 1, p. 9.
¶ See *Medical Commentaries*, p. 63.—Foot note.
** *Traité d'Anatomie Descriptive.* T. 2, p. 467.
†† *The Anatomy of the Human Body.* Vol. 3, p. 71.
‡‡ *Dictionnaire Ophthalmologique.* T. 2, p. 415.
§§ *Traité d'Anatomie.* Tom 1.
‖‖ *The Anatomy of the Human Eye*, p. 286.—The opinions of CLOQUET and HENLE, who have paid great attention to the anatomical peculiarities and other circumstances connected with the pupillary membrane, are quoted at some length in this work.

The anterior aspect of the *membrana pupillaris* is nourished by the vessels of the iris, (Haller, Albinus, Bærens, Wardrop, Bell,) and its posterior surface derives its vascular supply from the vessels of the ciliary processes, the capsule of the lens, and the hyaloid membrane (Hunter, Henle). As to the use of this membrane, it appears to me that its chief object is to support the anterior capsule and to prevent the lens from becoming dislocated prior to birth, until it has acquired a sufficient degree of firmness to retain its figure without stretching or pressing too much upon the capsule, and until the capsule has acquired sufficient strength to resist the pressure of the lens. It appears also to furnish a medium for the abundant ramification of vessels, until the due development of those numerous vessels which the function and nutrition of the iris requires, and also to keep it duly expanded, and to retain it in its proper situation; for did it not possess such a support, its pupillary edge would be very likely indeed to fall against, and acquire adhesions to, surrounding parts. Its use is differently explained by authors, but I believe the opinion I have now stated to be correct.

I have stated that the *membrana pupillaris* is very generally absorbed or ruptured at the period of birth, but it may remain, and, of course, it will either seriously impair or quite destroy vision just as it may happen to be dense, continuous and very vascular, or reticulated and thin. In the former case there will be noticed a red or grayish membrane continuous with the pupillary margin of the iris and completely occluding the pupil, and it will be slightly convex—slightly protruded towards the cornea; but, if the membrane be reticulated, and neither very thick nor vascular, there will be observed various filaments, (perhaps merely one or two fine vessels) which pass across the

pupil and connect together the opposing parts of the pupillary margin of the iris. Many such cases are on record; and Mr. Wardrop has collected some of them in his work on the *Morbid Anatomy of the Eye*. Similar cases have also been witnessed by Wenzel, Gavard, Jourdan, Jacob, and Lawrence.

Treatment.—If the *membrana pupillaris* remain only in one eye, and if it be firm and vascular, you had better not interfere; but if it be merely reticulated, you may pass a fine needle carefully through the cornea near to its margin, and most cautiously divide one or more of the frenulæ as may be deemed necessary. I do not think it would be justifiable to produce a cataract in the attempt to remove this pupillary membrane which only existed in one eye.

If the defect exist in both eyes you may then use the needle as for the posterior operation of solution, and if the membrane be very tough, you may employ the small knife suggested by Sir W. Adams, for the formation of artificial pupil. It may be necessary to perform several operations before the disease is cured.

After treatment.—In addition to the employment of the usual measures for the removal of any inflammation the operation may have excited, it would be advisable to apply the extract of belladonna to the eye-brow and forehead, once in the twenty-four hours, during the progress of the cure.

If the disease be undetected until adult age, if at that or at a latter period of life you are called upon to undertake an operation for the cure of the permanent *membrana pupillaris*, which is thick and vascular, you might then make an incision in the cornea, introduce Gibson's or Maunoir's scissors beneath the corneal flap, and excise a proper portion of the dense membrane, just as for a

favourable variety of closed pupil *(atresia iridis completa.)* If the *membrana pupillaris* be very fine and filamentous indeed, then you might try the effect of electricity upon the eye-ball, apply belladonna to the eyebrow, expose the eye suddenly to a very brilliant light, and endeavour in various ways to excite that degree of contraction of the radiated fibres of the iris which may be adequate to sever the frenulæ connecting together the opposing sides of the pupillary margin. These means may possibly succeed, but if they do not succeed, you must have recourse to an operation, and, for this purpose, you would pass a needle through the cornea near its margin, and very carefully divide the filaments which will exist in the pupil, without injuring the lens or its capsule;—it is on account of the risk of producing cataract that I recommend you to pass a fine needle through the cornea rather than through the sclerotica.

If the pupillary membrane were present in the eyes of an adult, the same operative proceedings would be necessary as for the cure of closed pupil with remaining capsule and lens, but the chances of success would not be considerable;—first, because the retina has never been duly impressed by light; and secondly, because the anterior chamber is small, and the development of the eye is rarely so perfect as it ought to be.

SECTION VI.—CONGENITAL ABSENCE OF THE IRIS.—CONGENITAL PECULIARITIES IN ITS COLOUR.—CONGENITAL DEFECTS IN THE FORM AND MAGNITUDE OF ITS PUPILLARY APERTURE.

I have seen two cases where no iris existed in either eye; they both occurred in infants who had been blind

from birth, who had never suffered from ophthalmia, who had sustained no local injury, and the exterior form of whose eyes, as well as their magnitude, was perfectly natural. I should certainly have thought it possible, that, in these instances, the iris might have been absorbed from some cause or other, if I had not examined the eyes at too early a period after birth to justify me in drawing such a conclusion. I do not deny, though I do not think it at all probable, that the iris might have been formed, and afterwards absorbed in utero. The appearance in both cases was so peculiar and palpable, that it could neither be overlooked nor mistaken for any other condition of disease; the whole of the cornea had an equally black appearance on a superficial examination, and when the eye was more minutely inspected, it did not present any other deviation from the perfection of its organization in any other part. The eye-balls had a peculiar oscillatory motion, the little patients were incessantly rolling them about with a regularity and energy which would have fatigued any set of muscles more directly under the control of the will, than these (the muscles of the eye-ball) appeared to be. I depend for any information I may have acquired respecting this congenital peculiarity, more on the attentive observation of these two cases than on the perusal of books;—as there existed no rudiments, not even the slightest vestige of an iris, I am inclined to think that in both these instances it was never formed. Whether, however, it had been formed as usual, and had afterwards become absorbed together with the *membrana pupillaris*, I am unprepared to determine. In these cases the patients were blind and remained so, and nothing I employed to excite the retina and restore vision influenced it in the slightest degree.

Sometimes the iris is very peculiar in its colour; the

iris of one eye and a greater part of the other may be blue or hazel, and the remaining portion may be of a totally different and of a much darker shade. This is of no real consequence, it gives a person, it is true, a singular and odd appearance, but it neither impairs vision nor impedes the motions of the iris. It is right, however, to mention it lest it should be confounded with the effects of inflammation, which has a strong tendency to change the colour of the iris, but it (inflammation) rarely operates in so peculiar a way and to so limited an extent, and when proceeding so far as to affect the colour of the iris, very often gives rise to other and more important changes. The appearance to which I am now referring, may exist as a solitary spot, or there may be many spots, or it may extend over a portion of the iris to a variable extent from its pupillary to its ciliary border. These conditions of the iris (which may exist in one or both eyes, as a simple macula or as many spots, or as implicating a great part of the iris) constitute, as I have stated, a congenital peculiarity and require no medical treatment. I have seen the irides of a different colour in children very many times; the iris of one eye has been blue, that of the opposite eye has been hazel, or the reverse of this has occurred, in short, they have differed to a greater or lesser extent as respects their colour. This defect has been oftentimes hereditary so that all or many of the children of the same family shall have had some singular spot upon the iris, different from its natural colour, or the two irides shall not correspond in their colour. I do not pretend to describe these variations minutely, I am only anxious to mention their occasional existence.*

* In a condition of perfect *albinism*, the iris is wholly deprived of its uvea, but Rudolphi has seen a dog in which only half of the iris was so affected; it is, however, pretty clear, that the quantity and intensity

The natural form of the pupil in man is circular, but sometimes it is not round, but oval or cordiform; the iris may be deficient at part of its circle or it may be gradually narrowed from its pupillary border to its ciliary margin, so that the apex, as it were, of the pupil may exist in the latter situation, and its broad part in the opposite direction. There may be two perfectly distinct pupils, or there may be, as it were, two pupils joined together—a sort of hour-glass pupil; or the edges of the pupil may be indented at various points, so as to give a festooned appearance to the pupillary margin, and this last change has been presumed to depend on some peculiarity or anomaly in the mode in which the *membrana pupillaris* has disappeared—such is the opinion of Professor HIMLEY.

These varieties in the form of the pupil are of no material importance provided that aperture be not thereby rendered excessively large nor extremely small, and provided no other imperfection, either in the transparency or the other properties of the tunics and humors of the eye, exists. Of these singular defects and capricious imperfections the cordiform pupil (cleft iris) is the most common, and occurs, as I have represented, from a defect of the formative process by which a portion of the pupillary border of the iris at some part of its circle, is wanting, which deficiency becomes less and less until it arrives at a point at or towards its ciliary margin, at which part the circle of the iris is not at all deficient—no deficiency of the iris usually exists at the margin of the iris close to the ciliary ligament. I have more than once seen a pupil elliptical from above downwards, and have many times

of colour of the uvea are liable to considerable variations; and that it may be present only on a part of the iris; and that it may exist in due quantity and intensity of colour in one or more parts, and be deficient in a certain degree in other parts.

witnessed a pupil oval either from above downwards, or from side to side.

Respecting that variety of pupil which I have termed cordiform (cleft iris) and the pointed or cleft part of which is almost always situated towards its lower part, I may mention that the cleft of the iris which constitutes the prolongation of the pupil, possesses the power (though not in an active degree) of contraction, so that when the eye is suddenly subjected to the influence of a vivid light, the cleft in the iris is nearly closed and the defect in the form of the pupil is scarcely visible. The deficiency of the iris at this part has been presumed by WALTHER to depend on a defect of the formative process, by which those parts (the two sides) of the iris which ought to have united have remained in a state of separation, and DR. AMMON asserts that he has proved by dissection that the fissure of the iris may be continued to the choroid and the retina and even to the hyaloid membrane and the lens; and both KIESER and CARUS have shown that in some animals there is a fissure of the retina and choroid at its lower part which is necessarily connected with the development of the eye; and Professor CARUS has further stated that in the young of many mammalia, there is an evident cicatrix in the sclerotica at the point corresponding to the previously existing fissure of the choroid and retina together with a firmer attachment of the choroid in this line, as supporting the supposition that a similar fissure existed to a certain extent in the sclerotica, at an early period of uterine life.*

* MR. MACKENZIE has published a very interesting paper upon this subject, *(coloboma iridis)* in the ninth volume of the *London Medical Gazette.* MR. WARDROP does not appear to have considered the subject with any reference to the development of the eye. The publication of DR. SEILER contains by far the fullest account of the imperfect and irregular development of the iris with which I am acquainted.

I have seen this cleft of the iris—this prolongation of the pupil—not merely at its upper or lower part, but *at various parts of its circle*, so that I do not imagine the iris is, in the fœtus, originally separated at its inferior and superior parts, and that its circle is completed by the union of these two semicircular portions of iris, as certain ingenious authors have stated.

CHAPTER IX.

MORBID AFFECTIONS OF THE CILIARY LIGAMENT, THE CILIARY PROCESSES, AND THE CILIARY BODY.

MORBID AFFECTIONS OF THE CILIARY LIGAMENT.—The *ligamentum ciliare* which is perforated by the vessels and nerves of the iris, is rarely the seat of any morbid change. I have inferred (no opportunity of instituting a post-mortem examination has occurred) the origin of tumours from it in several instances, but with this exception I do not know that it is ever the seat of any *primary* morbid affection which requires surgical attention.

MORBID AFFECTIONS OF THE CILIARY PROCESSES.—The ciliary processes are liable to become inflamed when those parts with which they are continuous and those to which they are contiguous, are affected with inflammation; so that they may be more especially expected to become so affected whenever the hyaloid membrane, the posterior capsule, the iris, and the choroid are inflamed. They may become absorbed, may acquire morbid adhesions to surrounding textures, may experience changes in their figure and arrangement, and may undergo various other pathological changes as a consequence of disease or severe inflammation of other parts of the eye, but I cannot point out any symptoms which are peculiar to, and distinctly characteristic of, a state of inflammation which is confined to the ciliary processes. It is said by BEER and others, that wounds of the ciliary processes are always followed by amaurosis and great dilatation of the pupil. I cannot accede to this opinion to its full extent, but I am confident

that if any extensive wound of the eye-ball has particularly implicated the ciliary processes, dilatation of the pupil and amaurosis may be expected to occur, and it may also be expected that the iris will be quite paralyzed at some particular part, so that its pupillary border will acquire an irregular figure, more especially when the eye is exposed to a strong light.

Morbid affections of the ciliary body.—Chronic inflammation of the *corpus ciliare* has appeared to me in a few instances to be succeeded by its permanent enlargement, at least I have several times observed the following condition of disease which I have referred to the inflammation and subsequent increase of the ciliary body:—there has been a slight degree of intolerance of light and increased lachrymation, the vascularity of the sclerotica has been considerably augmented, and especially so at some one or more points close or very near to the margin of the cornea. The polish of the iris and the mobility of the pupil have been a little diminished and the eye has been very painful. In the course of a short time the sclerotica bulges at those points which were formerly so particularly vascular, and it has acquired a dark-bluish or leaden tinge, vision is impaired, and the general inflammatory state of the eye is a little diminished. By the aid of antiphlogistic remedies, the administration of mercury, and the use of counter-irritation, the disease is prevented from increasing, and the pain subsides, but the enlargement of the sclerotica, and the dimness of vision remain, and the eye is particularly prone to a relapse of the inflammation from a very trivial cause.* In the class of

* The following example of disease appears to me to have consisted of inflammation of a portion of the *corpus ciliare*:—Lieut. Phillips, has suffered from slight weakness of the right eye for some time, but recently it has been the seat of pain and decided inflammation. When I first saw his eye with my worthy friend Dr. Kenney, the

cases I am now describing the inflammation does not at first particularly affect either the sclerotica, the iris, the choroid, the retina, or the ciliary processes, but some other part in their neighbourhood and immediately beneath the corneo-sclerotic junction, which part is left, as a sequel of such inflammation, in a state of induration and enlargement. I have verified this opinion only in one instance by a post-mortem examination—the ciliary body, was in that case, enlarged in a situation corresponding to the projected part of the sclerotica.

cornea was a little hazy towards its temporal side, the iris was also less brilliant on that side, than at other parts of its circle, the pupil was a little enlarged, the sclerotica increased in vascularity, and more especially so towards its corneo-sclerotic junction at the temporal side of the eye. This state of disease was eventually removed by the use of mercury, but it relapsed on several occasions, and at the present time there is a small projection of the sclerotica, nearly at its union with the cornea, which comprehends nearly a fourth of its circumference.

CHAPTER X.

DISEASES OF THE CHOROID.

INTRODUCTORY OBSERVATIONS.—The choroid coat of the eye is an extremely vascular tunic of a dusky-brown colour, but in very early life it possesses a reddish tint. It is expanded over the retina, being placed between the medullary or pulpy layer of that membrane and the sclerotica, and is continued towards the anterior part of the eye-ball as far as the ciliary ligament. That surface of the choroid which is opposed to the retina is covered by a dark pigment*, which is secreted by the minute vessels with which it is so abundantly supplied; but Professor MONDINI believes that "he has demonstrated the pigmentum nigrum to be a true membrane, extended over the whole internal part of the eye, between the retina and the choroid, and forming, independently of the choroid, a universal involucrum, denser at the ciliary processes and on the iris, and always more delicate as it approaches towards the optic nerve."

The free secretion of the pigmentum nigrum is so necessary to accurate vision, that whenever it is deficient in quantity or in the depth of its colour, vision is always

* It is said by some anatomists, that this pigment exists both on the *retinal* and the *sclerotic* surface of the choroid. Those anatomists who contend that the dark-brown pigment is only secreted on its concave surface, describe a delicate membrane which they assert covers that surface, and prevents the pigment itself from being in actual contact with the retina.

impaired; and SOEMMERING has shown that the choroid vessels (whence this dark-coloured secretion arises) do not diminish in magnitude, in proportion as the eye is small, but that the choroid coat of a small eye may be considered, as respects the number and magnitude of its vessels, as the choroid coat of a lesser eye.* It appears to me that the free secretion of the choroid pigment is most carefully provided for, in this arrangement of its vascular system, as being in man and various animals (in many of which it is of a much darker colour than in man) essentially necessary to correct vision. For, what other object is the very great vascularity of the choroid intended to answer? It is not required for the mere nutrition of its own texture; for, the proportions between its degree of vascularity and the quantity of *material* constituting its texture are widely different from the established proportions subsisting between other parts in these respects. It is not required for the nutrition of the retina, for the vessels of the choroid and the retina are only slightly and indirectly connected. There is not, in short, any ascertained necessity for the very great vascularity of the choroid, unless for the free secretion of the pigmentum nigrum. A great quantity of cellular tissue enters into the composition of the choroid in which its vessels ramify. By maceration a white flocculent mass may be detached from the interior of the choroid, which was formerly considered a distinct tunic, and named, by the son of its discoverer, "Tunica Ruychiana."

The arteries of the choroid ramify chiefly upon its inner and its veins upon its outer surface; the latter have a peculiar arrangement and are termed *vasa vorticosa.*

* SOEMMERING further asserts, "that the configuration of the vascular net-work of the choroid coat of the eye, in the various classes, genera and species of animals, is so different, that the coat of each may be thereby readily distinguished."

To enable me to determine under what class of membranes the choroid coat should be arranged, I have closely examined its texture after having washed away its pigment—reflected on the character of its diseases and their products*—and observed what analogy its healthy and diseased conditions bear to the natural and to the morbid states of other membranous parts—and the result of these efforts to determine its anatomical qualities, has been a decided conviction that it more nearly resembles the serous than any other class of membranes.

SECTION I.—INFLAMMATION OF THE CHOROID.†

The choroid is situated so deeply in the eye and is so covered on all sides by parts which effectually prevent us from ascertaining, by the aid of vision, the changes it is undergoing in the progress of inflammation, that we are scarcely surprised to find that even its acute inflammation is much more frequently overlooked than any other disease to which the eye is liable. But when it has proceeded to a certain extent its nature becomes evident by the indications of morbid changes which determine the permanent loss of vision.

It has been a question how far it is proper to consider the inflammation of the choroid a separate and independent

* "Exsudatione lymphæ plasticæ plerumque inflammatio tunicarum serosarum finitur, sic et chorioitis. Exsudata lympha conjungit chorioideam cum vicinis partibus: cum capsula lentis, retina, sclerotica, probabiliter etiam cum iride." SCHREIBER.

† The account of choroiditis I am about to give in the *text* is mainly derived from my own observation and practice. I have not been able to separate the disease into the two varieties of *acute* and *chronic*—its degree of severity, and its rapidity of progress, have varied in different instances, but I am unable to give any description of a definite disease, to which the term *chronic choroiditis* can be legitimately applied. Foreign writers speak of *arterious* and *venous choroiditis*—I have no practical acquaintance with this very refined distinction.

affection, but when we reflect on its situation, its sources of nutrition, and its mode of connexion with other textures, and moreover when we accurately observe the decided phenomena which are indicative of inflammation of its texture, I think it will be allowed that the reasons in favour of the separate existence of choroiditis are quite as cogent as those in favour of the separate and independent existence of iritis; and this may be readily admitted as well as that other textures of the eye are exceedingly prone to become inflamed in the *progress* of choroiditis.

Local symptoms.—Superficial redness.—There is sometimes a trifling enlargement of the sclerotic vessels, and a very faint and imperfect zonular arrangement of pink vessels around the cornea, but both these occurrences are very variable in degree, the latter in particular, being much more considerable where there is a concomitant affection of the iris. We cannot, of course, ascertain the state of the choroid vessels at this period of the affection by any actually demonstrative evidence, but we have no reason to suppose that their condition differs from that of vessels in other parts at the commencement of their inflammation. In the latter stages of the disease we shall presently explain that distinct indications of their true condition do exist.

Pain.—The pain is from the first somewhat acute, and arises in a great measure from tension of the globe; this feeling of tension will then be present, and there will also be deep-seated pain in the orbit, and distracting agony in the head generally either at its fore or back part, or there may be distinct hemicrania. This pain is not usually of an intermittent character—it is almost always uniformly and equally severe.

State of the pupil and iris.—The pupil is generally

somewhat enlarged, and its motions impaired, and it is very frequently pulled from its natural and central situation to either side, or more generally upwards and outwards—it is very evidently removed from its natural position. This is particularly noticed at the commencement, when the pupil is not much dilated, the iris appearing as though narrowed towards the affected part of the choroid and drawn backwards, but in the progress of the disease when the choroid is pretty equally and generally inflamed and the pupil extensively dilated, this change in its situation is less distinctly observed. The iris sometimes loses its polish in a greater or lesser degree, and when iritis is distinctly superadded to the original affection, the characters of the additional disease will be rendered evident by the usual symptoms.

Intolerance of light.—State of vision.—Mr. Mackenzie states that there is much intolerance of light in this disease, but this remark is scarcely coincident with my own observation. The enlargement of the choroid vessels produces great pressure on the retina, and, by consequence, materially impairs its sensibility and dimishes the accuracy of vision. The susceptibility of the retina is not more likely to be increased by pressure than is the sensibility of the brain liable to be augmented from the same cause. I state the results of my experience and observation, and whether my mode of explaining the dimness of vision and diminished sensibility of the retina during an attack of choroiditis be correct or otherwise, I am assured of the accuracy of the fact. There are other circumstances to which the dimness of vision may be partially owing, and particularly at the latter stages of choroiditis, such as, opacity of the cornea, dulness of the lens or vitreous humor, or compression of the retina from effusion which may have proceeded from the choroid vessels.

Tension of the eye-ball.—One of the early symptoms of inflammation of the choroid, is tension of the globe. On pressing upon the eye-ball during an attack of choroiditis, it is found to be very firm and hard, and this is owing, not of course to any alteration in the quality of its tunics, but to its increased plenitude. It is to this circumstance that I have attributed a great deal of the pain which attends this variety of inflammation.

Discolouration of the sclerotica.—The state of tension to which I have just referred is soon combined with a dark-brownish or bluish tinge of the sclerotica, the pressure it has sustained from within has produced its absorption—its attenuation—the choroid is partially seen through it, and we have consequently a leaden or dark-brown tinge of the sclerotic portion of the globe.

Projection or bulging of the sclerotica.—The change of which I am about to speak is the last of a series of morbid alterations in the sclerotica produced by inflammation of the choroid. In the *first* place, the sclerotica and the eye-ball are rendered tense by the enlargement of the choroid vessels and by effusion from their exhalent extremities; *secondly*, the sclerotica is so far attenuated by the pressure it has sustained that the choroid may be partially seen through it, and the eye may acquire a leaden or brownish tinge; and *thirdly*, the absorption of the sclerotica may, either from the pressure of a cluster of varicose choroid vessels or from some other cause, take place partially, so that it may bulge in one or many points, and generally around the cornea, giving rise to a variable number of bluish projections. This projection of the sclerotica from inflammation of the choroid may not, however, take place immediately around the cornea.

Effusion between the choroid and retina.—In some instances serous effusion may take place from the vessels

of the choroid and may separate that tunic from the retina, so that it shall form as it were a mere semi-opaque cord extending from the termination of the optic nerve to the posterior capsule; the vitreous humor being at the same time absorbed. You will readily understand how the retina will assume this cord-like form when it is separated from the choroid by a large quantity of fluid which eventually fills the globe in the place of the vitreous humor, which has been wholly, or in a great measure, absorbed. In such a case you would not expect to find those morbid changes in the sclerotica we formerly mentioned, to have occurred to the same extent. The choroid vessels having relieved themselves by effusion (which effusion has induced the absorption of the vitreous humor) would be much less likely either to become varicose or to give rise to that distention of the sclerotica which, in the former case, would be likely to elevate that tunic into a series of bluish-coloured projections corresponding to the clusters of varicose choroid vessels; and in the latter would give rise to *hydrophthalmia*, in addition to a dark-brown tinge of the whole of the sclerotic portion of the globe. You will understand that this effusion is much more likely to take place between the retina and the choroid, than between the latter membrane and the sclerotica: because it is on the under or concave surface of the choroid that its arterial system is developed, and where its secreting property mainly resides.

Constitutional symptoms.—If choroiditis be not preceded by, and connected with, some constitutional disease, such as gout, (and it very often takes place in gouty persons) syphilis (?) or scrofula, and if the individual be, prior to its occurrence, in a tolerably good state of health, any constitutional symptoms which may afterwards arise, must be attributed to the pain and sympathetic irritation

the local disease (the inflamed eye) occasions. The extent to which the constitutional symptoms will, under such circumstances, proceed, their severity, their variety, and their complication, will be influenced and mainly regulated by the constitutional peculiarities of the individual in whom they take place and the degree of severity of the local malady. With the exception of gout scrofula and syphilis (?) I do not know that inflammation of the choroid is especially associated, as regards the frequency of its occurrence, with any particular kind of constitution—any constitution having a morbid tendency. It has never occurred under my observation during infancy as an idiopathic affection. As regards the syphilitic inflammation of the choroid, I have reason to believe that it has occurred on two occasions in the course of my own practice as a primary affection.

Choroiditis is generally confined to one eye, it may, however, exist in both organs at the same time; but it is much more usual either for the disease to disappear altogether after having affected one eye, or to attack the other after it has been removed from the opposite organ, or just as it is subsiding there.

Effects of choroiditis.—The effects of choroiditis are very numerous and various, and, as respects vision, exceedingly important.

1.—Inflammation of the choroid coat may produce thickening of its own texture, and varicose enlargement of its vessels; it may separate its two layers from each other, or it may destroy its secreting properties; but I have never had reason to believe that the dark pigment has been increased by acute choroiditis.

2.—It may induce attenuation with permanent discolouration of the sclerotica, or it may give rise to a series

of nodulated enlargements of that texture, which are generally situated near to the corneal margin.

3.—It may cause the cohesion of the choroid with the sclerotica, or with the retina.

4.—It may lead to a certain amount of effusion between the choroid and the retina, or between the former membrane and the sclerotica;* and the consequent partial or total absorption of the vitreous humor.

5.—It may occasion opacity of the lens and glaucoma; absorption of the retina or paralysis of that texture from pressure; and to general inflammation of the eye-ball and disorganization of its various textures.

What is the condition of an eye which is deprived of vision by choroiditis, which has not induced collapse of the eye-ball or caused any material change in its figure? —You will generally find that the superficial vessels, and particularly those of the conjunctiva, are much enlarged, tortuous, and, in short, varicose;—that they terminate a little anterior to its edge, and that they are continuations of the muscular branches of the eye-ball, proceeding as one or two large vessels for a short distance, and gradually dividing into many large tubes as they approach the front of the eye, which are arranged for the most part almost entirely around the margin of the cornea at about the sixth of an inch from its junction with the sclerotica (a few of them sometimes pass nearly to the edge of the cornea)—that the figure of the pupil has undergone some

* Although the effusion of serum is the usual consequence of inflammation of the choroid, there is every reason to suppose that purulent effusion or lymphatic deposition may also take place. There is, indeed, nothing connected with the anatomical characters of the choroid texture, to induce us to believe that lymphatic deposition and purulent effusion ought not to be ranked among the occasional products of choroiditis—in fact, both these results of choroid inflammation have occurred under my own observation.

change and is dilated and drawn from its natural central position, and that perhaps the texture of the iris has experienced some change, its colour, for instance, may be altered. The sclerotica will be of a dark-brown or leaden colour, and will be very probably projected at one or more points around the cornea; the lens and the vitreous humor will be of a dingy-yellow colour, or will present what is termed a muddy appearance; the eye-ball will be unusually tense and hard; and there is every reason to believe that the retina may be compressed by the enlarged choroid vessels, and that the dimness or loss of vision in those cases where the texture of the retina has undergone no appreciable organic change, is owing to the pressure of these varicose vessels.

Diagnosis.—Inflammation of the choroid bears some, but a very slight, resemblance to iritis, retinitis, and glaucoma: I shall briefly point out a few of the more prominent circumstances which distinguish these different affections.

Choroiditis is distinguished from iritis at its early stage, by the greater degree of tension of the globe, of dimness of vision, and of pain in the eye-ball, and by the absence of a distinct vascular zone around the cornea and of much superficial redness of the eye, and of any change in the *colour* of the iris. It is distinguished from retinitis by the absence of that increased sensibility to light which characterizes, in a remarkable degree, the early stages of inflammation of the retina; by the existence of a slight zonular arrangement of vessels around the cornea; by the greater degree of tension of the globe; and by the absence of those intensely vivid and unpleasant scintillations which always accompany retinitis. Choroiditis is distinguished from glaucoma by a less degree of dimness of vision and of change in the colour and transparency of the humors of the eye, and by the greater

rapidity of its progress, and by the greater severity of the pain with which it is attended, and also by the indications of external inflammation which are present.

Prognosis.—The prognosis will rarely be favourable because we seldom witness a case sufficiently early to enable us to control it by treatment, so far as to prevent the occurrence of those pathological changes which necessarily injure vision. When it has passed its first stages, either the choroid vessels remain permanently enlarged or other effects destructive to vision are either in an advanced progress, or are already produced.*

Causes.—The exciting causes of choroid inflammation are, as far as I have been enabled to discover:—1, inflammation of some proximate texture;—2, blows upon the eye, and various forms of injury, such as occur after the operation for cataract;—3, sudden transitions from total darkness to vivid light;—4, employing the eyes in the inspection of minute objects by gas or some other brilliant light, with the head in a depending position;—5, increased circulation in the head;—6, and also that increased vascularity of the eye in particular, which, working at a fire, or by a large body of heat or flame, has a tendency to produce, and especially when this cause is accompanied with that flickering variable and unequal light to

* Mr. Travers has the following remark at page 131 of his *Synopsis*, which will serve to indicate how little progress was made in this country so late as 1824, in discriminating inflammation of the choroid from other ophthalmic affections. "It is probable, however, as the iritis presents considerable varieties in its form, its access and progress, relatively to the superficial inflammation, and the kind and degree of pain and dimness which accompany it, that the choroid is the seat of the primary inflammation in those cases in which the changes upon the iris take place later than the other signs of internal inflammation, viz. the arrangement of the vessels, the pain, and the *obscurity of vision*. I have often seen cases of this description, which I have felt disposed to denominate choroiditis."

which the eyes of forgers and some other artizans are so much subjected.

Treatment.—Bleeding.—Of all the remedies for the subduction of choroid inflammation, venesection is by far the most important; we have promptly to arrest an inflammation of a part which, if it continue, will lead to the permanent loss of the tonicity of its vessels and their consequent enlargement, and this can only be effectually accomplished by lessening the quantity of the circulating fluid, and by diminishing the vigour of the circulation. It may be preferred, to accomplish this object, by cupping the temples or the back of the neck, and provided a sufficient quantity of blood be abstracted, it is not very important whether this object be effected by opening a vein, or by cupping. This method of reducing inflammation of the choroid is of the highest importance, until, at least, its vessels have undergone that degree and duration of distension which prevents them from recovering their original magnitude, or until important changes are wrought in the form and texture of the sclerotica. Then, indeed, bleeding will not be adequate to remedy the mischief, nor will it be required for the removal of any existing defect. The application of leeches to the lower lid may be necessary after general bleeding has been practised, and particularly if there is much superficial redness and varicose enlargement of the external vessels.

Mercury.—Aware of the efficacy of mercury in arresting inflammatory action generally, it may be supposed, that its administration would be serviceable in this disease if given immediately after free depletion which has been practised soon after the occurrence of the attack. But it is not necessary to administer mercury to the induction of its specific effect, for the removal of the *effects* of choroiditis (when those effects have actually been produced), as hydrargyrus would be prescribed for the removal

of the *effects* of iritis, for there exists very little similitude between many of the consequences of these two affections. Mercury in conjunction with a small quantity of opium given at short intervals immediately after the detraction of blood, is the best course I can recommend in the treatment of acute choroiditis at its *commencement*, and it will be remembered, that this plan of treatment is peculiarly advisable, where there is reason to believe that the inflammation of the choroid is connected with syphilis.

Purgatives.—Purgatives are useful after the employment of the previous measures, or they may be required where the patient is unable to bear the administration of mercury, for the purpose of lowering the system, and on this account the saline class of purgatives is far preferable to any other. Where the bowels are much confined, the tongue loaded, the breath fetid, with an ill taste in the mouth, it may be necessary to *commence* the treatment by prescribing an active purgative.

Nauseants.—Nauseants may be used for the purpose of lowering the system after depletion has been practised, where the patient from delicacy or peculiarity of constitution is unable to bear the due administration of mercury.

Turpentine and iodine have also been recommended; the latter, I presume, under an impression that choroiditis has sometimes a certain alliance with scrofula, but they are both, as far as I am competent to deliver an opinion of their respective merits, very inferior in the utility and efficacy of their action, to the free administration of calomel and opium, and (in those cases where the disease is connected with scrofula) to the sulphate of quina.*

* In the year 1833, Mr. Mackenzie recommended the arseniate of potass, as a remedy for choroiditis, and he appears to think, that given in the form of pill, in the thirty-second part of a grain three times a

Tonics.—In the treatment of an acute inflammation of a highly vascular texture of the eye possessing a strong tendency to lead to changes destructive to vision if unarrested in its progress, the employment of tonics at its early stages is entirely out of the question; on the contrary it is usually necessary to have recourse to very energetic depletory measures. You may, indeed, employ tonics when the latter stages of the disease have arrived, and when the constitution, being enfeebled either by the long continuance of pain and irritation or the employment of active antiphlogistic treatment, the mere *effects* of inflammation of the choroid remain; or you may employ them, together with the abstraction of blood by leeches, when the disease is unusually mild or tardy in its course, or when it occurs in a feeble strumous person. The constitutional circumstances of the patient will determine the choice of tonics, but if no circumstance exist to negative its use, I should recommend the sulphate of quina.

Counter-irritation.—Counter-irritation is extremely useful after bleeding has been premised, and I am in the habit of placing a seton in the temple and, at the same time, of keeping open a blister at the back of the neck, not only during the existence of the inflammatory state of the choroid, but also so long as the slightest irritation of the eye remains, and I am convinced, and particularly when I reflect on the tendency of this disease to relapse and

day, it is capable of curing the disease, and also any effects it may have produced short of "large sclerotic staphyloma." He says, "under the influence of the arseniate of potass upon this disease, I have had the satisfaction, in a number of instances, to observe the varicose vessels to shrink, the blueness to become whiter, the humour of the sclerotica and choroid to fall, and the patient's health and vision to improve." *Medical Gazette.* Vol. 12, p. 18.—I shall be most happy to learn that the remedy continues to maintain its character.

assume a lingering chronic form, that this is by far the most important means of cure, after bleeding and the free administration of mercury, with which we are acquainted.

Tapping the eye.—I have explained that there is great tension of the eye-ball in inflammation of the choroid, partly from the enlargement of the choroid vessels, and partly from effusion into the globe; and that the eye is thereby rendered very painful, and the sclerotica much attenuated and sometimes partially projected externally. Now, these circumstances are precisely those, which, in my opinion, render the operation of tapping the globe necessary if that operation can ever be required, which some practitioners erroneously, as I think, deny. You may indeed also tap the eye when the symptoms have subsided and are replaced by simple hydrophthalmia, or by the staphylomatous projections which we have before represented, as being so frequently produced by inflammation of the choroid coat of the eye. Now, in performing this operation would it be right to puncture the cornea or the sclerotica? When the pain is extremely great, the sclerotica pretty generally and equally tense, the lens in its proper situation and the cornea not materially projected forwards, you had better pass a fine grooved needle through the sclerotica at about four lines from the margin of the cornea so as to evacuate the effusion which has most probably taken place between the choroid and the retina, and this should be done without displacing the crystalline lens, which I am now presuming has not yet been absorbed by the pressure occasioned by the increase of the fluid contents of the globe. But if the sclerotica is distinctly projected at one part or at many parts, you would, of course, puncture it at that point where its projection was greatest and its attenuation most considerable. Again, if the iris be much bulged forward so as to have acquired a convex figure,

I should strongly recommend you to puncture the cornea as being likely to relieve, in the most efficient manner, the tension of the globe.*

When vision remains exceedingly dim on the subsidence of the acute symptoms, and there is reason to refer this dimness of sight to the varicose enlargement of the choroid vessels, I believe the most useful plan of treatment that can be adopted consists in the formation of a seton or issue in the temple and the occasional application of leeches to the lower eye-lid. But it is an unfortunate condition of things and is not very likely to be amended by any measures we may employ for its removal.

SECTION II.—ABSENCE OF THE CHOROID PIGMENT, AND VARIATIONS IN ITS COLOUR AND QUANTITY.

Absence of the choroid pigment in the human subject generally leads to impaired vision in a greater or lesser degree. This defect may be congenital or it may take place at any after period of life. The loss of the secreting power of the choroid has been known to succeed choroiditis under circumstances which rendered it probable that the choroid coat was subsequently absorbed. When

* In the eighty-second number of the *Edinburgh Medical and Surgical Journal*, Dr. Martland has related a case of staphyloma of the sclerotica, in which, as the patient refused to permit a more extensive operation, *paracentesis oculi* was performed thirty-three times, and with eventual success as regards the diminution of its magnitude and the relief of pain. I mention this case because it exemplifies the benefit resulting from the adoption of a very excellent mode of relieving patients at an early stage of this affection, from a state of severe pain, and at its latter stages of lessening, without exciting much pain or inconvenience, one of the most irritating and mischievous effects it has a tendency to produce.

the choroid pigment is deficient from birth, it is usually at the posterior part of the membrane only—that part towards the ciliary processes being properly supplied with it.

Variations in the colour and quantity of the choroid pigment sometimes take place. It may be excessively abundant or it may be exceedingly scanty, and instead of retaining its natural brown colour it may become very pale or intensely black. Melanosis of the eye was formerly considered to be merely an increased secretion of the choroid pigment. Deficiency of the choroid pigment is productive of, and connected with, certain forms of amaurosis.

SECTION III.—ABSENCE OF THE CHOROID COAT.

The choroid coat has been known to be absent; and this want of the choroid coat may occur as a congenital defect or it may take place from disease. It has been known to result from choroiditis, from hydrophthalmia, from the development of tumours in the eye, and from staphyloma of the sclerotica. Partial absorption of the choroid is more frequent than the total absorption of that membrane. When the choroid is entirely absorbed, vision, at least useful vision, is destroyed.

SECTION IV.—OSSIFICATION OF THE CHOROID.

The choroid has been frequently found ossified, and the ossific formations may consist of one or two small depositions of ossific matter, or the whole of the membrane may be converted into a shell of bone. When removed from the

eye there exists a small aperture in the bony cup which indicates the place where the optic nerve passed through it to be expanded into the retina. Many well authenticated cases of ossification of the choroid are upon record: Mr. Wardrop has witnessed several, and he has collected others from the writings of Bichât, Haller, Morgagni, Pellier, Morand, Scarpa, and Günz. Mackenzie and Travers allude to this pathological change but do not appear to have seen any example of it in the course of their own practice. Ossification of the choroid has also been witnessed by Lenhosseck, Müller, and Jacobson.

The vessels of the choroid are liable to become ossified and to undergo the same morbid changes as occur in blood-vessels in other situations.

CHAPTER XI.

DISEASES OF THE RETINA.

Introductory observations.—The retina is an expansion of the optic nerve; it is situated between the vitreous humor and the choroid, and passes nearly to the ligamentum ciliare.* It consists of two parts; the medullary which is opposed to the choroid, and the membranous or vascular portion which is in contact with the hyaloid membrane of the vitreous humor. In its healthy state it is perfectly transparent, but in the dead subject it is opaque and of a grayish colour. The nutrient artery of the retina *(arteria centralis retinæ)* ramifies in what I have termed its membranous or vascular layer, and in addition to this vascular layer and its medullary layer Dr. Jacob has fancied he has discovered a third layer or membrane situated between the medullary layer and the choroid.

* The precise point at which the retina terminates anteriorly is variously represented by anatomists. The different opinions upon this subject are thus arranged by a German writer.

1. The retina reaches no further than the middle of the vitreous humor.—Fallopius and Vesalius.

2. It terminates at the exterior margin of the processus ciliares.—Meckel, Soemmering, Wrisberg, Zinn, Rudolphi, Velpeau, Home, Jacob, Paullucci.

3. It extends to the circumference of the lens, where it is inserted in the capsule.—Ferrein, Haller, Lieutaud, Monro, Winslow.

4. It is continued into the processus ciliares.

5. Having reached the external margin of the zone of Zinn, it forms a defined edge, from which it extends, as a very delicate membrane, to the margin of the lens.—Bærens, Walter, Doellinger, Hesselbach.

SECTION I.—ACUTE INFLAMMATION OF THE RETINA.*

Symptoms.—At the commencement of acute retinitis the patient will complain of an intensely agonizing deep-seated pain in the eye, sometimes of a darting and in other instances of a throbbing pulsating character; this pain, which may be said to usher in the attack, will frequently occur most suddenly and unexpectedly, and will not be preceded by any symptoms indicative of its approach. There will also be a sense of fulness and tension of the globe, with vivid scintillations or meteoric flashes of light. The pupil will be at the same time much contracted, and will be found to have lost its clear black appearance; the iris will be slightly projected towards the cornea; there will be great intolerance of light and profuse lachrymation. The external redness will not be at this stage very considerable; a few of the sclerotic vessels may be enlarged, and there *may* be a slight zonular arrangement of pink vessels around the cornea, but this zonular arrangement of vessels as well as the enlargement of those of the sclerotica, is much less than what occurs in inflammation of the iris and choroid—it is indeed sometimes absent and always quite disproportionate to

* We speak of the varieties of inflammation when seated in many of the textures of the eye: we distinguish the variations in the inflammations of the conjunctiva, of the iris, and so on, and it is of course probable, that the inflammation of the retina differs also in different instances, and if we could with equal facility contrast its states under a condition of inflammation, it is probable we should discover every reason to arrange its inflammatory affections in a similar manner; so that when inflammation of the retina occurs in connexion with any constitutional affection, such as gout, rheumatism, scrofula or syphilis, it is necessary to observe how far the course and progress of the inflammation are modified by these morbid conditions or predispositions of the system.

the severity of the other symptoms. As the disease advances, the agony in the eye and head become increased, the patient will sometimes complain of great *tightness* of the head and heat of the scalp, and these symptoms may be carried to so distressing an extent, that unless familiar with this disease, you may be tempted to regard the affection of the eye merely as a symptom of the more important affection of the head, which, under such circumstances, you might presume to be present—I mean, phrenitis. A great degree of attention to the history of the case is absolutely necessary to prevent us from confounding the *disease* with its *effects*.

The intolerance of light from having been extremely great is after a time so far diminished that the patient is rendered almost insensible to its stimulus, the pupil becomes dilated and motionless, it has quite lost its clear black colour, and has acquired a dingy muddy tinge, sometimes indeed the lens and vitreous humor are of an amber or greenish colour; the iris is projected towards the cornea so as to be nearly in contact with its neural surface, and the pale pink zonular arrangement of vessels has become much more distinct, and perhaps there may now be much external vascularity of the globe. This state of things may give rise to amaurosis, and may leave the eye in the following condition: iris convex anteriorly and nearly in contact with the cornea—pupil large and immoveable—lens and vitreous humor of a dingy green, or amber colour—and retina quite insensible to light. And here it may be proper to inquire, why is the retina insensible to light? Can the inability to distinguish the ordinary light of day be referred either to the enlargement of the ramifications of the central artery of the retina, or to the dulness of the crystalline and vitreous humors? It appears to me, that neither of these occurrences are

adequate to produce that total blindness which is so frequently consequent on retinitis unattended by any manifest change in the figure of the globe. There is no doubt but that the texture of the retina has itself undergone important change, and that its insensibility is referable to some organic alteration produced by the severity or continuance of the inflammatory action; the more frequent and important of which is, lymphatic deposition within or upon its texture.

Such is the history of simple acute retinitis; but the disease, as was formerly mentioned, has a tendency to implicate other textures, it has a tendency to extend to the iris and choroid, and when this is the case there will be superadded to the affection of the retina, the symptoms of iritis or of choroiditis, or of both, as they may happen to have occurred. The pink zone around the cornea will then be fully formed, there will be great superficial vascularity, the eye-ball will become extremely tense, and the sclerotica will acquire a bluish or brownish tinge; the pupil will become more and more contracted until it is completely or almost closed; the iris also will be discoloured and will acquire a greenish or reddish hue; there will be frequently an effusion of lymph or pus into the chambers of the eye, which will project the cornea forwards and excite great torment until it either burst spontaneously or be opened by artificial means. The ultimate effect of this combined affection, on the textures of the eye, will be various. There may exist at the same time the effects of simple acute retinitis—those of choroiditis and iritis—and in unusually severe, neglected or mismanaged cases, collapse of the eye-ball.

I have said that the progress of acute retinitis is extremely rapid, and its effects, when its course has been unarrested by remedies, very destructive to vision, and,

I believe this statement corresponds with the opinion of nearly every surgeon who has paid much attention to ophthalmic maladies. Mr. Travers says, "I have seldom seen an example of this inflammation (retinitis) which seemed to afford time for the beneficial operation of a remedy." Mr. Lawrence, on the contrary, remarks that a case of acute retinitis came under his observation in the person of a cook, who had been blind in consequence of an attack of retinitis for *three days*, but whose sight was eventually restored by the treatment he recommended. I do not think any accurate information respecting the *average* course and effects of this disease, can be obtained from either of these statements; for, in the first place, many cases fall under our observation in which ample time is afforded for the beneficial operation of remedies, whilst few instances in which retinitis has proceeded so far as to destroy vision for three days, will eventually be cured by any remedies whatever.

It will be remarked that some writers on ophthalmology represent the pupil as being contracted in retinitis, whilst others state that it is dilated; again, some say there is great intolerance of light, and others remark that the retina is quite insensible to its stimulus; and all these statements are correct, with certain qualifications. The actual state of these questions appears to be as follows:—the pupil is, at first, somewhat contracted, and there is great intolerance of light, the retina being, at that stage of the affection, in an excited state; but this condition of things is very rapidly exchanged for a dilated pupil and a more or less considerable degree of insensibility of the retina. When the pupil remains permanently dilated, it is most probable that the disease has been confined to the retina, but when it is much contracted, with other changes in the form of the pupillary aperture and in the colour of the iris,

then it is quite certain that the iris itself has participated in the inflammatory action which has wrought those changes in its texture and in the figure of the pupil, which, unarrested iritis, unconnected with inflammation of any other part, would be likely to produce. You will distinguish then the symptoms of the first from those of the latter stages of acute retinitis, and discriminate the affection of the retina from ' at of the internal tunics generally, and also the effects of the former from those of the latter disease. Do not forget the vascular connexion which subsists between the external and internal membranes of the eye, and remember that with respect to the retina, the intimacy of this connexion is much less than that which subsists between the iris and the choroid, the sclerotica and the conjunctiva.

Retinitis does not usually exist in both eyes at the same time, but I have seen it both in its acute and chronic form, arise, advance, and terminate in both organs pretty nearly at the same period.

I do not think retinitis is by any means a common disease; BICHÂT thinks it is extremely rare, but MR. LAWRENCE says "the retina is perhaps as liable to inflammation as the iris;" and MR. WARDROP remarks that "in most cases of ophthalmia, in whatever texture of the eye inflammation commences, the retina generally participates; the degree being always indicated by the increase of the sensibility of the eye to light." I do not think this sympathetic affection of the retina—this simply increased sensibility to light—ought to be termed a condition of inflammation, although it is evidently so considered not only by WARDROP, but by MIRAULT, DUPUYTREN, and others.

Constitutional symptoms.—There is no form of inflammation of the eye which excites so much constitutional

irritation, as acute retinitis, and I have already explained that so severe are these symptoms in some acute cases, and so great is the intolerance of light, the anxiety of the countenance, the pain, and agonizing sense of tension in the head, and so distressingly great is the heat of the scalp and the nervous excitement of the system, that we might be almost tempted to regard the symptoms as proceeding from phrenitis unless well acquainted with those produced by retinitis.

Diagnosis.—Inflammation of the retina sometimes resembles choroiditis and acute glaucoma. It is, however, attended with more pain, more intolerance of light, and less tension of the globe than inflammation of the choroid, and further, the sclerotica is not discoloured, the arrangement of pink vessels around the cornea is less distinct, there is less superficial vascularity, and the progress of the disease is altogether more rapid. From acute glaucoma it may be distinguished by the following circumstances:—the pain and intolerance of light are greater, the pupil is more contracted, the humors of the eye are less cloudy, the progress of the disease is very much quicker, and the constitutional symptoms are infinitely more severe.

Causes.—Any thing capable of suddenly impressing the retina with the stimulus of brilliant light as contrasted with its recent degree of stimulus; or of maintaining a state of intense excitement of the retina for any great length of time; or of exciting and maintaining an undue degree of vascularity of that membrane, may be classed among the causes of retinitis; thus, a sudden flash of lightning—sudden exposure of the eye to the bright glare of the sun on first rising in a morning—continued exposure of the eyes to the ordinary light of day after having been for a long time confined in a dark apartment—frequent exposure of the eyes to the glare of a large hot fire—

employing the eyes much in the inspection of minute polished objects, or in reading or writing for an unusually long period—determination of blood to the head, or increased activity of the circulation of the eye in particular, may all be enumerated among the causes of retinitis. From this statement it would appear that the individuals most liable to its attack are, miners—smiths—cooks—astronomers—literary characters—and mechanics engaged in avocations requiring them to be constantly and closely inspecting the minute, polished, or vividly-coloured objects of their attention. I have witnessed the disease many times in attorney's clerks and in persons employed as artists in the offices of architects; and certainly when it was the custom to employ the eyes by the aid of gas-light in the injudicious manner which was too often adopted on the comparatively general introduction of that mode of lighting apartments, the disease was particularly prevalent, though more generally in a chronic form. It is said that certain conditions of the system and particular diseases predispose to retinitis, such as, general plethora, a determination of blood to the head, severe fever, phrenitis, and so on.

I have known a person to be affected with retinitis from walking out for a long time together in the middle of a clear bright day when the ground was covered with snow, and the inhabitants of snowy countries are so well aware of the occurrence of a disease which they term "snow blindness," that, as a means of protecting their eyes, they make use of a contrivance somewhat similar to our spectacles, except that, instead of the central glass which usually covers the front part of the eye-ball, there is only a minute aperture in the centre of the ivory or wood of which they are composed—this aperture is generally an horizontal slit or chink. It is said that the native princes of India, when doomed to blindness by the envy or hatred of their rivals,

are compelled to look stedfastly for a certain period upon a concave mirror of highly polished steel; and those who have had an opportunity of witnessing the eyes of these unfortunate blind individuals, state, in presumed verification of the opinion that this cruel punishment induces loss of sight by causing retinitis, that there are no ostensible indications of change in the form, appearance and texture of the eyes themselves. But this statement is, as I conceive, rather opposed to the supposition that their blindness has been occasioned by retinitis consequent on looking intently upon the polished concave mirror;* for, of course, acute retinitis so produced and for the cure of which no remedial measures were employed would not be so generally limited in its effects. Acute inflammation of the retina, as we meet with it in practice, frequently changes the form of the globe and generally effects a visible alteration in some one or more of the textures of the eye.

Treatment.—In the first place you would enjoin complete rest of the eyes, and place the patient in a dark apartment. Secondly, you would bleed without delay *ad deliquium animi*, and repeat this operation in a few hours if the pain in the eye and head and the tension of the globe returned with extreme severity. Thirdly, you would place the system under the influence of mercury as rapidly as possible consistently with the constitutional condition and other circumstances of the patient. And lastly, you would direct the application of blisters to the summit of the head, and the use of some mild narcotic fomentation if the face and eyes are acutely painful; or, if there existed much frontal agony, you would direct the mercurial oint-

* Is not the blindness produced by looking for some time upon the polished mirror, dependent on paralysis of the retina from excessive stimulus, and quite unconnected with inflammation and its effects?

ment mixed with opium to be rubbed just above the eyebrow every third or fourth hour. This is the plan of treatment to be adopted at the commencement of the disease in its acute form in strong plethoric subjects; but we may be called in at its latter stages when there is no longer any reasonable chance of restoring vision, and, of course, it would then be advisable to make use of those measures, which would be best calculated to relieve pain and to remedy as much as possible the tendency to the production of any effects capable of exciting irritation.

If the cornea be bulged forward by purulent effusion, it would be desirable to open it, because its confinement will occasion great pain, and its discharge must sooner or later be effected by an opening in the cornea which, unless made by the surgeon, may be a long time before it be produced by ulceration, absorption or sloughing of that tunic. The dimness of vision sometimes consequent on retinitis, unattended by an obvious want of transparency in the humors of the eye, is most successfully treated by the insertion of a seton in the temple, and by exciting and maintaining a slight degree of salivation.

Acute retinitis being so rapid in its progress and so likely to lead to effects calculated to impair the integrity of a texture (the retina) most necessary to accurate vision, it becomes highly important that any remedies which may be employed should be equally powerful in their operation and prompt in the production of their effects. It appears to me that the copious removal of blood, the rapid production of salivation, and the exclusion of light from the patient's apartment, combined with a low unstimulating diet, are the measures to be chiefly relied upon in the management of this terrific disease.

SECTION II.—CHRONIC RETINITIS.

There is a chronic form of retinitis which sometimes takes place in literary persons—those who write much by artificial light—in watch makers, and those who employ their eyes much in the inspection of minute polished objects either with or without the aid of glasses. This disease generally advances very slowly and without much pain, and the inflammation is usually limited to the retina, the sensibility of which is gradually destroyed by the deposition of lymph within or upon its texture, and it is not improbable that other organic changes also occur. I think this chronic state of disease possesses a tendency to establish a varicose enlargement of the choroid vessels and of the arteria centralis retinæ and its ramifications.

The best mode of treating this disease consists in the administration of small doses of mercury so as to induce and maintain slight salivation, and in the employment of permanent counter-irritation in the neighbourhood of the disease. Of course, the eyes should not be employed to their usual extent, and the retina should be protected from bright light.*

SECTION III.—INCREASED AND DIMINISHED SENSIBILITY OF THE RETINA.

The sensibility of the retina may be increased from many causes, and particularly from sympathy with various inflammatory states of the eye and the brain; and many disordered or diseased states of the system may give rise

* The importance of purgatives in the treatment of various affections of the retina has been very elaborately discussed by Mr. Wardrop in the *Lancet* for October, 1834. I shall speak of their efficacy when treating of amaurosis connected with various disordered states of the retina.

to a very temporary or a more prolonged attack of increase in the sensibility of the retina. The retina may acquire, an increase of sensibility, from the circumstances under which it exerts its function, so that a person confined in a dark room has been able in the course of a week or fortnight, to see objects pretty distinctly in his dreary apartment, which he could not at first perceive; and on removing from his dismal habitation to the ordinary light of day, he has been obliged to protect his eyes from its influence. This fact has been proved on a more extensive scale when a number of prisoners confined in dark cells have been suddenly liberated—they have been totally unable for some time after their liberation to sustain the ordinary light of day.

The treatment of this unpleasant ailment is, of course, little more than the treatment of the disease whence it arises. It is, however, always desirable to guard the patient's eyes from bright light and vivid colours, and to apply a blister to the back of the neck. In a case of this kind Dr. Elliotson prescribed the local application of belladonna, but, as I have previously pointed out (*Medical Gazette*, Vol. viii., p. 457) such an application is a very improper one, inasmuch as, by enlarging the pupil, the morbidly sensible retina is exposed to the increase of that stimulus, which is so particularly painful and injurious to it.

The contrary condition may exist—the sensibility of the retina may be impaired.

This state of the retina may be the result of either too much or too little exposure of the eye to the influence of light. The function of the retina may be permanently impaired if either insufficiently or excessively exercised. This condition of the retina may be induced by various morbid states of the system and the brain, into the investigation of which we shall more particularly enter when treating of amaurosis.

SECTION IV.—VARIOUS PATHOLOGICAL CONDITIONS OF THE RETINA.

The pulpy matter of the retina may become absorbed, or it may have been deficient from birth. It has become absorbed after retinitis; after a varicose enlargement of the vessels of the choroid; as the result of effusion between the choroid and retina, and as the consequence of dropsy of the eye-ball; and it has been absent or nearly so in many old amaurotic subjects, and in cases where the retina has been long deprived of its proper stimulus—I have termed this state of things, *atrophy of the retina.* It has been found thickened, converted into ligamentous matter, and instances of *ossification* of the vascular layer of the retina are recorded by HALLER, MORGAGNI, MANOURY, ROGNETTA, GOSSET, MAGENDIE, and ANDRAL.*

MR. TRAVERS says it is probable that the "opaque retina" is sometimes congenital.† LARREY saw a case in which the retina was reduced "en putrilage."‡ On dissecting an amaurotic eye, HEUSINGER discovered "three transparent vesicles, of a pyriform shape, and the size of a pea, adhering to the outer surface of the retina.§

* ANDRAL states that atrophy of the optic nerve and retina are generally connected with an ossified condition of the latter membrane. Atrophy of the eye-ball is very commonly associated with ossification of the retina in horses.

† *A Synopsis of the Diseases of the Eye*, p. 157.

‡ *Mémoires de Chirurgie Militaire.* T. 1, p. 220.

§ See *Lancet.* Vol. 14, p. 173.

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